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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

IN RE APPLN. OF: SMITS et al.

SERIAL NO.: 09/600,732

FILED: July 20, 2000

FOR: PROCESS FOR THE MANUFACTURE OF CHICORY INULIN . . .

GROUP: 1637 Confirmation No. 8993

EXAMINER: SURYAPRABHA CHUNDURU DOCKET: TIENSE RAFF.26

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**TRANSMITTAL LETTER**

Dear Sir:

In response to the Notification of Non-Compliant Appeal Brief mailed September 7, 2006, enclosed please find Appellants' Substitute Appeal Brief, Claims Appendix, Evidence Appendices A-E and Related Proceedings Appendix A.

No fee is believed necessary for this filing. In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account No. 08-1391.

Respectfully submitted,

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**CERTIFICATE OF MAILING**

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**APPELLANTS' BRIEF ON APPEAL**

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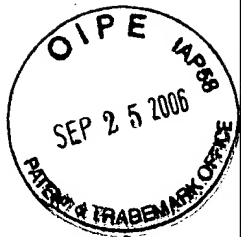
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This Brief is being filed in support of Appellants' Appeal from the Rejection mailed January 10, 2006. A Notice of Appeal was timely filed under a Certificate of Mailing on April 10, 2006.

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**REAL PARTY IN INTEREST**

The Real Party in Interest in this Appeal is Tiense Suikerraffinaderij N.V., a company organized under the laws of Belgium who took title by way of assignment from the inventors recorded in the USPTO on July 20, 2000 at Reel 010972, Frame 0501.

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**RELATED APPEALS AND INTERFERENCES**

The Board of Patent Appeals and Interferences issued a decision on Appeal whereby Administrative Patent Judges, Toni R Scheiner, Donald E. Adams and Lora M. Green reversed an earlier Final Rejection of Examiner. The Decision was mailed July 28, 2004, Appeal No. 2004-1498. The claims now on Appeal are identical to the claims considered by the Board in the earlier Appeal No. 2004-1498.

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**STATUS OF THE CLAIMS**

Claims 1-64 and claim 71 have been cancelled. Claims 65-70 and 72-97 stand finally rejected and are on Appeal. As noted in the Related Appeals and Interferences Section, *supra*, the claims on Appeal, i.e., claims 65-70 and 72-97 are identical to the claims considered by the Board in the earlier Appeal No. 2004-1498. The claims on Appeal are set forth in the **Claims Appendix.**

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**STATUS OF AMENDMENTS**

Appellants filed as a supplement to Amendment F, mailed October 3, 2005, a resubmission of Exhibit C. An Action was mailed on January 10, 2006. Appellants elected to proceed directly with the instant Appeal rather than to respond to the Action of January 10, 2006, since the claims, the applied art, and the rejections were essentially identical to those considered in the previous Appeal.

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### SUMMARY OF CLAIMED SUBJECT MATTER

Inulin is a carbohydrate which occurs in many plants and which can be produced by certain bacteria. Inulin from plant origin consists of a polydisperse composition of chains of oligo- and polysaccharides which are composed of fructose units linked to each other through  $\beta(2-1)$  fructosyl-fructose linkages, and which mostly terminate in one glucose unit. Inulin from plant origin is usually composed of linear chains, but may also contain some branched chains.

A main plant source for inulin are the roots of Chicory (*Cichorium intybus*) and tubers from Dahlia and Jerusalem artichoke in which inulin can be present, respectively, in concentrations of about 15 - 18%, 12% and 14 to 18%, respectively, on fresh weight. Inulin can be readily extracted from these plant parts, purified and optionally fractioned to remove impurities, mono- and disaccharides and undesired oligosaccharides, in order to provide various grades of inulin. (Specification page 1, lines 12-25).

Chicory is conventionally cultivated in certain northern parts of Western Europe, where it is seeded in Spring (usually in April) and the roots are harvested, stored and processed for inulin production late Autumn, usually from about mid September to about the end of November, yielding through conventional manufacturing techniques standard grade chicory inulin with a average degree of polymerisation ( $\overline{DP}$ ) of about 10. The whole growing and processing period typically covers about 150 to about 230 days. It is known that the degree of polymerisation (DP) and the average degree of polymerisation ( $\overline{DP}$ ) of the inulin, as well as the content of inulin in the chicory roots (i.e. the % by weight of inulin in the fresh root material) increase during the growing season to reach a maximum after about 150 days of growing, whereas the biomass of the roots and thus the yield (in ton/ha) of inulin increase until

about the end of the growing season. The end of the growing season is the time when the biomass of the roots ceases to increase significantly (i.e. typically after about 180 to about 200 days of growing), which usually corresponds to the end of October. Towards the end of the growing season, the degree of polymerisation (DP) and the average degree of polymerisation ( $\overline{DP}$ ) of the inulin in roots remaining in the soil, as well as in harvested and stored roots, begin to decrease with time, and the rate of decrease usually significantly increases from about the beginning of November. This characteristic considerably limits the periods for growing (including seeding and growing) and for processing, including harvesting (harvesting period and harvesting as such), storage, and processing as such, of the chicory roots for the production of inulin, hydrolysates and derivatives of inulin in a technically and economically attractive manner.

Consequently, in spite of the fact that the manufacture of inulin from chicory roots constitutes the most important route to inulin, such manufacture is nevertheless confronted with considerable hurdles and problems, including: (i) a limited time frame, including limitations in duration of the period as well as in time period of the year, during which chicory roots can be seeded, grown, harvested, stored and processed for the manufacture of inulin in a technically and economically attractive manner and/or without undergoing a significant decrease of the  $\overline{DP}$  of the inulin in the roots, (ii) a rather low mean  $\overline{DP}$  of standard grade chicory inulin (which has a  $\overline{DP}$  of about 10), (iii) a need to include a fractionation step in the manufacturing process of chicory inulin when, for example for technological or nutritional reasons, inulin is required with a  $\overline{DP}$  which is higher than the  $\overline{DP}$  of about 10 of known standard chicory inulin, (iv) the rather poor yields of known fractionation processes leading to inulin with a higher  $\overline{DP}$  when chicory inulin of standard grade (with a  $\overline{DP}$  of about 10) is used as the

source inulin, and (v) the economical unattractive situation of the plants for the processing of the chicory roots.

These processing plants are commonly operated during only a few months a year and are sized to process a large quantity of chicory roots in a very limited period. The processing of the roots for the manufacture of inulin, or of an intermediate as mentioned above, commonly takes about a day, whereas the entire processing period, including the harvesting (harvesting period and harvesting as such), storage and processing, of the roots, commonly lasts about 60 to about 90 days. (Specification page 8, line 20 - page 9, line 31).

The present invention provides a process for the manufacture of chicory inulin from chicory roots in which the chicory roots forming the source material have been seeded, grown and processed under selected climatological temperature conditions that fall partially or wholly outside conventional growing and processing periods. (Specification page 9, line 35 to page 10, line 2 and page 11, lines 32-36).

Selected climatological temperature conditions are meant as those conditions which are such that the fructose exohydrolase (FEH) gene in chicory roots is not triggered by the occurrence of low temperature conditions as discussed above. (Specification page 12, lines 9-11).

More particularly, as set forth in independent claim 65, the sole independent claim on Appeal, the present invention provides a process for the manufacture of chicory inulin from chicory roots through conventional post-harvesting manufacturing techniques, wherein the source material for the process are roots from chicory grown in appropriate regions and which have been grown and processed under certain selected climatological temperature conditions which are such that during a period of at least from the beginning of the third month of the

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growing period till the end of the processing of the chicory roots, the FEH gene in the chicory roots has not been triggered (i.e. not triggered at all or not triggered to a significant extent) by the occurrence of low temperature conditions which are such that the temperature in a thermometer shelter shall not have dropped below minus 1°C (Specification at page 11, lines 24-26), the chicory roots have had a growing period of at least 150 days, preferably at least 160 days, more preferably about 180 days (Specification at page 12, lines 26-28), and wherein the chicory has been seeded in the northern hemisphere within a time period selected from the time periods ranging from December 1 till March 14, from May 15 till May 31, and from June 1, preferably from June 15, till November 30, provided that when the chicory has been seeded in the period from May 15 till May 31, or from June 1 till June 14, the chicory roots have had a growing period of at least 180 days, or in the southern hemisphere within a time period selected from the time periods ranging from June 1 till September 14, from September 15 till September 30, from October 1 till November 14, from November 15 till November 30, and from December 1, preferably from December 15 till May 31. (Specification page 12, line 28 to page 13, line 2).

In other words, the invention on appeal is based in part on the discovery that under certain selected climatological temperature conditions, chicory roots can be grown and processed into inulin, including a growing period of the chicory of at least 160 days, preferably about 180 days, and a processing period of the roots of at least 60 days, preferably about 90 days, without occurrence of considerable inulin chain degradation in the roots, and that from chicory roots grown and processed under these selected climatological temperature conditions, improved standard grade chicory inulin, can be obtained through conventional manufacturing techniques, without fractionation, with a mean  $\overline{DP}$  taken over a processing period of at least

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60 days, preferably 90 days, which is at least 20% higher, usually from 30 to 50% higher, and typically about 40% higher, than the mean  $\overline{DP}$  taken over a corresponding processing period of known standard grade chicory inulin. (Specification page 13, line 26 to page 14, line 2).

Thus while known standard grade inulin commonly has a mean  $\overline{DP}$  (over a processing period of at least 60 days) of about 10, improved standard grade inulin from chicory roots grown and processed under selected climatological conditions of the present claimed invention has a mean  $\overline{DP}$  (over a processing period of at least 60 days), of at least 12, usually from 13 to 16, and typically of at least 14. (Specification page 14, lines 19-23).

In the process according to the present invention on appeal the proper climatological temperature conditions are such that during the concerned time period immediately preceding the end of processing of the chicory roots, the temperature as measured in a thermometer shelter has not dropped below minus 1° C. (Specification, page 15, lines 18-23).

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**GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

The issues presented on Appeal are:

(1) Whether claims 65-70, 72-78, and 89-97 are patentable under 35 USC § 103 over Yamazaki et al. (U.S. Patent 4,613,377) in view of the literature reference to Van Den Ende et al. (Plant Physiol. Vol. 149; 43-50, 1996) and Institute Royal Meteorologique de Belgique (temperatures for January 1, through December 31, 1994). The Examiner cites Yamazaki et al. as teaching processing of chicory inulin from chicory roots in cold conditions. (Final Action, at page 3, second paragraph). However, the Examiner acknowledges that Yamazaki et al. does not teach the specific growing periods and temperature conditions recited in claim 65 (paragraph bridging pages 3-4 of the Final Action). The Examiner takes the position that the cited growing periods and conditions are taught by Van Den Ende et al. and the Institut Royal Météorologique de Belgique (paragraph bridging pages 4-5 of the Final Action, and first full paragraph on page 5 of the Final Action). The Examiner takes the position that claim 65 and the several claims 66-70, 72-78 and 89-97 which depend thereon would be obvious by combining this art.

(2) Whether claims 79-88 are patentable under 35 USC § 103 over Yamazaki et al. in view of Van Den Ende et al. and The Royal Institute of Meteorological Center, Belgium, 1994 as applied to claims 65-70, 72-78, and 89-97 above, and further view of Van Loo (U.S. Patent 5,560,872). Claims 79-88 all depend directly or indirectly on claim 65. The Examiner applies Yamazaki et al. and Van Den Ende et al. as above (Final Action at page 7), but acknowledges that neither Yamazaki et al. nor Van Den Ende et al. teach production of inulin free monomeric saccharides, dimeric saccharides and oligofructose (Final Action, page 8, first

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full paragraph). However, the Examiner cites Van Loo et al. as teaching production of inulin free of mono-and disaccharides (Final Action, page 8, second full paragraph). The Examiner concludes that it would be obvious to modify the method taught by Yamazaki et al. with the method taught by Van Den Ende et al. and the method taught by Van Loo et al. to achieve claims 79-88 (Final Action, paragraph bridging pages 8-9 thereof).

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## ARGUMENT

Before presenting arguments concerning the rejection, the references used as the basis of the rejection will be described briefly.

(1) Yamazaki et al.

The primary reference Yamazaki et al. teaches a process for manufacturing a syrup of fructose or of fructose and [polydisperse] oligofructose from an aqueous inulin solution by, respectively, complete hydrolysis or partial hydrolysis of the inulin. According to Yamazaki et al., the aqueous inulin solution is obtained by extraction with hot water from tubers of Jerusalem artichoke or from chicory roots using a purely conventional process (Yamazaki, col. 10, line 57 to col. 11, line 4). However, Yamazaki et al. only discloses conventional cultivation of Jerusalem artichoke tubers and chicory roots, including harvesting in late October (col. 12, lines 22-27). Thus, the process for obtaining the aqueous solution of inulin, including the source chicory roots, disclosed in Yamazaki et al. is entirely conventional.

(2) Van Den Ende et al.

Van Den Ende et al., like Yamazaki et al., utilizes chicory roots that are cultivated in a conventional manner. On p.44, Col. 1, Materials and Methods, it is indicated that chicory was sown (in, e.g., Belgium) on June 1 and that on a weekly basis after July 26, plants were uprooted and the roots were investigated for fructan analysis/degrading till December 6th. This covers a total period of 189 days. However, in Belgium frost occurs from the end of October. Accordingly, the chicory of Van Den Ende et al. has had a growing period free of frost (and thus without triggering of the FEH gene) of about 153 days, which is far below the at least 180 days stipulated in claim 65 for chicory sown in the Northern Hemisphere from June 1 till June

14. Subsequent cold storage at +1°C and forcing at 16°C of the roots, disclosed in Van Den Ende et al., is directly related to the production of Belgian endive and clearly falls outside the scope of the present invention.

(3) Van Loo et al.

Van Loo et al. teaches a method for preparation of inulin that is free from low molecular weight polysaccharides (oligosaccharides), starting from standard grade crude or purified inulin. There is no teaching or suggestion as to how the source material is seeded, grown or harvested.

(4) Institute Royal Meteorologique de Belgique (also referred to as The Royal Institute of Meteorological Center, Belgium) (sic)

Institute Royal Meteorologique de Belgique ("RMI") teaches the temperatures for the city of Ukkel for the year 1994.

(1) The Rejection should be reversed as a matter of law since essentially the same art and identical claims were already considered by the Board in the earlier Appeal No. 2004-1498.

Appellants stress that during the earlier Appeal No. 2004-1498, all four of the above references were of record, including temperatures obtained from RMI, and were ultimately rejected as failing to establish a prima facie evidence case for obviousness under 35 USC § 103 over identical claims. The RMI temperatures were specifically rejected as speculative for the town of Hevrelee where the Van Den Ende et al. studies were conducted. Ukkel is located to the south of Brussels and Heverlee is located to the northwest of Brussels. Appellants urge that the failure of the Examiner to overcome the need for prima facie evidence as decided by

the Board in the earlier Appeal No. 2004-1498 cannot be overcome using the same prior art sources that were previously rejected as inadequate.

(2) The rejection of claims 65-70, 72-78, and 89-97 as obvious from Yamazaki et al. in view of Van Den Ende et al. and RMI is in error.

Claims 65-70, 72-78 and 89-97 are rejected under 35 USC § 103 as being obvious from Yamazaki et al. in view of Van Den Ende et al. and RMI. The Examiner cites Yamazaki et al. as teaching generally a method for processing of chicory inulin from chicory roots through conventional manufacturing techniques (Office Action at page 3). The Examiner acknowledges that Yamazaki et al. does not however teach that the periods for seeding/growing/processing include no triggering or production of the fructan exohydrolase ("FEH") gene in chicory roots as required by the instant claims (Office Action at page 3). In fact, not only is Yamazaki et al. completely silent regarding the possibility of cultivating chicory roots for the manufacture of inulin in periods that do not correspond to conventional ones, Yamazaki et al. does not provide motivation or incentive to consider such. Yamazaki et al. does not contain any teaching about the possibility or need of cultivating and/or using such source chicory roots for the manufacture of inulin. Yamazaki et al. further does not teach the possibility of developing an improved process for the manufacture of inulin or inulin hydrosylates obtained by non-conventional growing/harvesting/processing conditions, as described by in the present invention.

Appellants submit that the conventional cultivation of chicory roots, including seeding, growing and harvesting/processing, is clearly excluded from the scope of claim 65. The terms of the claim define, through the combination of all the claimed features, a requirement (seen as

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a whole) that clearly is not fulfilled by the conventional cultivation of chicory roots, e.g., such as taught by Yamazaki et al. The subject invention resides in part in the use of a particular source material for the process of manufacturing inulin, whereby the source material has to fulfill particular requirements that result from the combination of particular seeding periods, particular growing periods, particular harvesting /processing periods, and particular temperature conditions during well defined growing and harvesting/processing periods. The use of such particular source material in the process according to the present claimed invention results in considerable technical advantages, including improved grades of inulin (Specification p.13, lines 10-20 and p.16, lines 6-14) as well as an extension of the possible growing period and growing season with subsequent technical benefits (e.g. Specification, p. 24, line 33 to p.25, line 24). Thus, Yamazaki et al. cannot be said to teach or suggest the claimed invention.

Acknowledging the deficiencies of Yawazaki et al., the Examiner posits with the previously made argument that the claims would be obvious based on the teachings of Van Den Ende et al. The Examiner cites Van Den Ende et al. as teaching that "seasonal changes in the biochemistry of fructan storing organs has been largely focused on the examination of changes in the stored carbohydrates. The observed changes in carbohydrate concentrations five-fold increase in fructose concentration) (sic) very well correlate with a breakdown of high DP fructans." (Office Action at page 5). The Examiner then speculates, in the same syntax used in prior rejections, that "[t]he shift from high DP fructans from (sic) low DP fructans could be due to the action of FFT using low molecular weight carbohydrates as acceptors." (Office Action at page 6). The Examiner thereby concludes "An ordinary practitioner would have reasonable expectation that the combination [of] the method of Yamazaki et al by incorporating the proper claim climatological conditions, (that is avoiding no frost days) which partially or wholly fall

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outside conventional seeding and growing conditions taught by Van Den Ende et al. and the Royal Institute of Meteorological data center, would result in achieving the expected advantage of developing an improved process of preparing chicory inulin.” (Office Action at page 6).

These are essentially the same arguments the Examiner made during the earlier Appeal No. 2004-1498 with the added incorporation of the RMI data, which was also addressed in the earlier Appeal No. 2004-1498. (The RMI center for Brussels is in Ukkel). The Examiner has done this in spite of the fact that the Board has already ruled in the previous Appeal No. 2004-1498 (1) that Van Den Ende et al. does not supply the missing teachings to Yamazaki et al. , and (2) that it would not be obvious to one skilled in the art to combine the method of Yamazaki et al. with the method of Van Den Ende et al. in any event (BPAI Decision in Appeal No. 2004-1498 at page 13). The only difference between the earlier rejection which was reversed by the Board in Appeal No. 2004-1498, is the incorporation of the RMI data officially as a prior art reference for rejection. However, the Examiner provides no explanation as how the same RMI data supplies the missing teachings and provides the motivation to combine.

Van Den Ende et al. does not teach or support the cultivation of chicory roots as source material for the production of inulin or the inulin hydrolysates fructose and oligofructose. Van Den Ende et al. merely confirms the conventional knowledge that inulin is synthesized in chicory roots during the growing season, that inulin already starts degrading from mid-September onwards, increasingly degrading from mid October (thus even before the end of the growing season at about the end of October, marked by a cessation of the increase of the biomass of the chicory roots), and further degrading during harvesting, cold storage and forcing (Van Den Ende et al., page 44, paragraph starting line 3; page 47, left column, last sentence;

Fig. 3, Fig.4 and Fig.5; and subject patent application Specification page 8, line 20 to page 9, line 7).

The Board in the earlier Appeal No. 2004-1498 agreed with Appellants that Van Den Ende et al. does not provide teachings as to the cultivation of chicory roots as source material for the manufacture of inulin, inulin hydrolysates or inulin derivatives, and further that Van Den Ende et al. does not contain any disclosure, teaching or incentive for the skilled person about the possibility to cultivate chicory roots as source material for the production of inulin, inulin hydrolysates, or inulin derivatives, partly or completely outside the conventional cultivation period (BPAI Decision in the earlier Appeal No. 2004-1498 at page 10). Furthermore, Van Den Ende et al. is completely silent with regard to the triggering of the FEH gene and its inulin degrading activity as a result of particular low-temperature conditions. This missing teaching also was recognized by the BPAI (BPAI Decision in the earlier Appeal No. 2004-1498 at page 8). Nothing has changed. Van Den Ende et al. is still Van Den Ende et al.

Moreover, Van Den Ende et al. actually teaches away from non-conventional cultivation of chicory roots, as it generically teaches that low temperature conditions should be avoided because they provoke degradation of inulin in chicory roots. In the Office Action, the Examiner quotes from Van Den Ende et al.: "The shift from high DP fructans to low DP fructans could be due to the action of FFT using low molecular weight carbohydrates as acceptors..." (page 5 line 22 - page 6 line 1, as quoting from page 48, Col. 2, paragraph 2 of Van Den Ende et al.). Here Van Den Ende et al. at best speculates as to a possible effect of seasonal changes in the biochemistry of fructan storing organs.

In the earlier Appeal No. 2004-1498, the Board found (Decision at page 8) that the Examiner provided no evidence to suggest that Van Den Ende et al. contains any teaching or

suggestion about the Appellants' findings that low temperature conditions that trigger the FEH gene may occur in a well-defined early stage of the growing period of the chicory roots without having negative effects on the cultivation of the chicory roots later on. It is highly surprising and non-obvious that once the FEH gene has been triggered by low temperature conditions early in the growing season, the inulin degrading activity of the triggered FEH gene is not reflected by the absence of inulin synthesis later on in the growing period, particularly the synthesis of inulin of high  $\overline{DP}$ , such as  $\overline{DP} > 10$  and  $\overline{DP} > 20$ . As the Board pointed out in its decision in the earlier Appeal No. 2004-1498, "The examiner... provides no evidence, and we find none, to suggest that Van Den Ende recognized that it is critical that the temperature not drop to the point where the temperature within a thermometer shelter drops below minus 1° C" (BPAI Decision in earlier Appeal No. 2004-1498 at page 10).

In an attempt to prove that the temperature did not fall below -1° C in Heverlee, during the time in question for the Van Den Ende et al. study, the Examiner re-introduces corresponding temperature readings from RMI for the southern Brussels suburb of Ukkel, Belgium (RMI, temperatures for January 1, through December 31, 1994 (Office Action, pages 5). The Examiner has already been unsuccessful in employing this strategy. When the Examiner presented temperature readings in the earlier Appeal the BPAI responded as follows:

"Furthermore, to the extent that the examiner would have relied on a 'printout of weather conditions for Brussels, Belgium allegedly to show that growing conditions in Belgium for the time period reported in Van Den Ende et al. did not fall below 1° C,' see Brief, page 15; as appellants point out (id), "[t]he [e]xaminer has failed to establish prima facie that the temperature conditions in Heverlee [the locus of the Van Den Ende's study]... would be the same as the temperature conditions [in] Brussels.' In this regard, we remind the examiner that conclusions of obviousness must be based upon facts, not generality." (BPAI Decision in Appeal No. 2004-1498 at page 12).



Taking this BPAI admonition into account, re-providing the temperatures of Ukkel sheds no light on the Examiner's original and already reversed arguments for claim rejections. The Examiner though, has continued to rely on these temperatures and has required Appellants under 37 CFR 1.1.05 to provide separate temperature information for Heverlee during the time in question to overcome this data (Office Action mailed July 8, 2005 at page 2). While it is not Appellants' burden to provide historical temperature information, particularly where none is known to exist, Appellants were able to identify and provide temperature records for the period in question from the town of Herent, which actually is much closer to Heverlee than Ukkel is (the approximate distance between Ukkel and Heverlee being about 28 km and the approximate distance between Herent and Heverlee being only about 4.3 km). The temperatures from Herent illustrate that during the period of the Van Den Ende et al. study, the town of Herent did drop below 1° C. The Examiner has rejected these temperatures, based on there being days in the record where the temperatures are similar to those in Ukkel. Thus, the Examiner's use of these data still fails to overcome what is the Examiner's initial burden in establishing a prima facie case for obviousness. *In re Peehs*, 612 F.2d 1287 (C.C.P.A. 1980). Notwithstanding, the Examiner uses this presumption to support the already rejected arguments outlined above.

Appellants understand that the temperature readings of Herent cannot be equivalent to the temperatures of Heverlee during the dates in question. However, the combined RMI data illustrate that the temperature readings of Ukkel are in fact a wholly inaccurate estimator of the temperatures of Heverlee during the dates in question. From the meteorological data measured at Herent it follows that the daily minimum temperature may be up to about 1° C lower than the daily minimum temperature measured in Ukkel. The temperature of Ukkel on October 18 was 1° C, and December 2 and 3 it was 0° C. The temperature of Herent October 18 was -1.1° C, on

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December 2 it was  $-1.3^{\circ}\text{C}$  and on December 3 it was  $-1.2^{\circ}\text{C}$ . It is impossible to factually conclude that the temperatures of Herent were equivalent to the temperatures of Heverlee on the days at issue. However, the temperatures of Herent illustrate exactly what this Board initially stated regarding the Ukkel information, namely that it cannot be used to determine the temperatures in Heverlee. The RMI data from Ukkel does not provide evidence that during the growth period of the chicory roots in Heverlee according to Van Den Ende et al., the temperatures did not drop below  $-1^{\circ}\text{C}$  in December and also in mid-October, thus avoiding the triggering of the FEH gene.

It is of further significance that the Board in the earlier Appeal No. 2004-1498 noted that Van Den Ende et al. does not teach that  $-1^{\circ}\text{C}$  is in fact the FEH triggering temperature (Decision, page 8). The Board also noted that nowhere within Van Den Ende et al. is there any suggestion that  $-1^{\circ}\text{C}$  must not occur during the specific period of the growing-harvesting-storage-processing period of chicory inulin (Decision page 8). In fact, evidence of the temperature dropping below  $-1^{\circ}\text{C}$  is found in Van Den Ende et al., based on the present invention's disclosure regarding triggering the FEH gene, where it is reported that 'the FEH activity only significantly increased after October 15, (1994)'.<sup>1</sup> This statement about mid-October corresponds well with the occurrence of a temperature below  $-1^{\circ}\text{C}$  on October 18 in nearby Herent.

A person of ordinary skill in this art could not find any incentive in the prior art (i) to try to cultivate chicory roots for use as source material for the manufacture of inulin, hydrolysates and derivatives of inulin, outside the conventional period, or (ii) to try to optimize

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<sup>1</sup> Van Den Ende et al., page 47, right, column, 2<sup>nd</sup> half; page 48, right column, paragraph 3, and Fig 4, which even shows the FEH activity based on a measurement on October 18!

the conventional cultivation of chicory roots by mere routine experiments to arrive at a cultivation period at least partially outside the conventional period in accordance with the subject invention.

Appellants also wish to point to some secondary considerations to support the non-obvious character of the invention and claimed subject matter. These secondary considerations include addressing a long felt need in the industry for an improved method for the production of inulin, hydrolysates and derivatives, including various aspects such as (i) the growing, harvesting and storing/processing of plant source material spread over a longer period of the year, and (ii) the average DP of the inulin (Specification, page 9, lines 8-31). Furthermore, as indicated in the Specification (page 24, line 1 to page 25, line 24), the technical and economical advantages of the present invention are considerable. According to the present invention, the period for seeding, growing, harvesting, storing, and processing may be much longer than the conventional period. The invention enables the processor to have a supply of chicory roots source material spread over a larger part of the year. This in turn enables a processing plant to be utilized over a longer period of the year, which makes the processing plant more efficient and economically much more attractive (see Specification page 24, line 33 to page 25, line 24). In this respect, based on the subject invention and in order to exploit the resulting technological and economical advantages, ORAFIT Chile, a business unit of the assignee, is presently constructing an inulin production plant in Chile.

In view of the above reasons, Appellants submit that the present invention and the subject matter of the current claims are non-obvious from the combination of Yamazaki, Van Den Ende et al. and RMI. It is therefore requested that the rejection is in error and should be reversed.

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(3) The rejection of claims 79-88 as obvious from Yamazaki et al. in view of Van Den Ende et al. and RMI, temperatures for January 1, through December 31, 1994 and further in view of Van Loo et al. is in error.

Claim 79 and the several claims 80-88, which depend directly or indirectly thereon, are all directed to a process for the manufacture of high performance grade chicory inulin as defined in the claim using as the source material chicory roots grown and processed under the conditions defined in claim 65. The deficiencies of the combination of Yamazaki et al. and Van Den Ende et al. vis-à-vis claim 65 are discussed above and are incorporated herein by reference.

The Examiner refers to Van Loo et al. as teaching "a method of producing inulin free with (sic) low molecular weight polysaccharides by isolating inulin from chicory roots with hot water to obtain aqueous solution of inulin, purification of inulin followed by concentrating the inulin solution by partial removal of water" (Office Action at page 8). The rejection states "...it would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made, to modify a process for producing chicory roots for manufacturing inulin as taught by Yamazaki et al. with the method of growing and harvesting chicory roots as taught by Van Den Ende et al. and the method of producing polydispersed saccharides as taught by Van Loo et al. to achieve expected advantage of developing a process for manufacturing improved Grade chicory inulin from chicory roots under proper climatological temperatures...an ordinary practitioner would have been motivated to combine the method of Yamazaki et al. with the method of Van Den Ende et al. by incorporating the proper climatological conditions and production of inulin free of polydispersed saccharides...in order

to achieve the expected advantage of developing a method for production of improved grade inulin" (Pages 8-9).

Note that with regard to this rejection, Examiner has provided no support for the rejection already reversed by the Board in the Decision in the earlier Appeal No. 2004-1498 other than adding in the RMI temperatures for the town of Ukkel, which as noted supra is significantly further away from Heverlee than Herent.

Van Loo et al. does not supply the missing teachings to Yamazaki et al. and Van Den Ende et al. to achieve or render obvious Appellants' claims. Van Loo et al., which is a prior patent of Smits, one of the named inventors of the subject application, merely relates to inulin that is free of low molecular weight polysaccharides (oligosaccharides) and to a method for preparation of the same. With regard to the technical solution disclosed and claimed in the present patent application, Van Loo et al. merely concerns a preparation of a particular grade of inulin by means of a particular process that starts with standard grade crude or purified inulin.

In the present application, claims 79-88 all require a particular source material, i.e., chicory roots grown and processed under the unconventional conditions specified by claim 65. Thus, the rejection of claims 79-88 as obvious from Yamazaki et al. and Van Den Ende et al. in view of Van Loo et al. also is in error.

(4) The Rejection is essentially a rehash of a previous rejection which Board already reversed in earlier Appeal No. 2004-1498.

The rejection of the claims on Appeal is essentially based on prior art previously considered by the Board and found to be insufficient to sustain a rejection in earlier Appeal No. 2004-1498. The only difference between what was considered in the earlier Appeal and the instant Appeal is the formal incorporation of the RMI meteorological data for the year 1994.

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This is nothing more than an attempt by the Examiner to resuscitate already reversed rejections. For one, the town of Ukkel is approximately 28 km from the town at issue, Heverlee, Belgium, as opposed to 4.3 km for Herent. Second, the Examiner previously was admonished by the Board in the earlier Appeal No. 2004-1498 for attempting to introduce temperature evidence from Brussels/Ukkel as an indicator of temperature readings for Heverlee. Third, Appellants have introduced temperature readings from Herent, approximately 4.3 km away from Heverlee, which provide temperature evidence that contradicts the Examiner's argument. Fourth, the Board has already determined that independent of temperature readings of Heverlee during the Van Den Ende et al. experiment, there is no evidence that Van Den Ende et al. recognizes that it is critical that the temperature not drop below - 1° C.

The prior art references neither teach nor suggest which enzyme is mainly responsible for the degradation of inulin in chicory roots at the end of the growing season and during storage and processing to inulin, nor even what conditions trigger the production of the enzyme and/or the pronounced FEH activity of the enzyme. The applied prior art also neither teaches nor suggests any possibility or means of excluding the triggering of the production and/or the activity of said FEH enzyme. Thus, no combination of the applied art could achieve or render obvious the claimed invention.

In view of the prior art, it was non-obvious to obtain by the process of the present invention inulin, with a higher mean  $\overline{DP}$  over a long (at least 60 days) storage and processing period, than the one of conventional inulin. The prior art in effect teaches away from the claimed invention in this respect, as prior to the present invention, the conventional wisdom of the state of the art was that at the end of the growing period, the  $\overline{DP}$  drops and thus the chicory roots have to be processed as soon as possible. Furthermore, considering the long felt need for

industrial quantities of inulin product with an improved  $\overline{DP}$  and considering the long period the industry has already had, and failed, to solve this need, it is respectfully submitted that the present claimed invention is non-obvious, and that the rejection of the claims is in error.

Appellants respectfully submit that nothing has changed from that considered by the Board in the earlier Appeal No. 2004-1498. If anything, the temperature records from the RMI for Herent provide further support not only for the prior Board's prior decision, but also for this Board to reverse the Examiner's Rejection.

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**CONCLUSION**

In view of the foregoing, it is respectfully requested that the Examiner's Rejection of the subject Application be reversed in all respects.


Respectfully submitted,



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**CERTIFICATE OF MAILING**

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**CLAIMS APPENDIX**

**Claim 65:** In a process for the manufacture of chicory inulin from chicory roots through conventional manufacturing techniques, the improvement which comprises:

- using as a source material for the process roots of chicory which have been grown in appropriate regions and have been seeded, grown and processed under climatological temperature conditions which are such that during a period of at least from the beginning of the third month of the growing period till the end of the processing of the chicory roots the fructan exohydrolase (FEH) gene in the chicory roots has not been triggered by the occurrence of low temperature conditions which are such that the temperature in a thermometer shelter shall not have dropped below minus 1°C,
- said chicory roots have had a growing period of at least 150 days,
- said chicory has been seeded
  - in the northern hemisphere within a period selected from the periods ranging from December 1 till March 14, from March 15 till May 14, from May 15 till May 31, from June 1 till June 14, and from June 15 till November 30, provided that when said chicory has been seeded in the periods from May 15 till May 31, and from June 1 till June 14, the chicory roots have had a growing period of at least 180 days, and provided that when said chicory has been seeded in the period from March 15 till May 14, the chicory roots have been grown and processed under climatological conditions wherein, within a period of at least 220 consecutive days immediately preceding the end of the processing of the roots, no low temperature conditions occurred which triggered the FEH gene, and the chicory roots have had a minimum growing period of at least 160 days,

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- in the southern hemisphere within a period selected from the periods ranging from June 1 till September 14, from September 15 till September 30, from October 1 till November 14, from November 15 till November 30, and from December 1 till May 31.

**Claim 66:** In a process according to claim 65, the improvement wherein the chicory has had a growing period of at least 180 days.

**Claim 67:** In a process according to claim 65, the improvement wherein the chicory has been seeded in the northern hemisphere.

**Claim 68:** In a process according to claim 65, the improvement wherein the roots of chicory have been grown and processed under climatological temperature conditions wherein, within a period of at least 220 consecutive days immediately preceding the end of the processing of the roots, no low temperature conditions occurred which triggered the FEH gene in chicory roots, said roots have had a growing period of at least 160 days, and the inulin obtained is improved standard grade chicory inulin with a mean average degree of polymerization ( $\overline{DP}$ ) taken over a processing period of at least 60 days, which is at least 12.

**Claim 69:** In a process according to claim 68, the improvement wherein no low temperature conditions which trigger the FEH gene in chicory roots occur within a total period of at least 240 consecutive days and the chicory has had a growing period of at least 180 days.

**Claim 70:** In a process according to claim 69, the improvement wherein the chicory has been seeded in the northern hemisphere within a period selected from the periods ranging from December 1 till March 14, from March 15 till May 14, from May 15 till May 31, and from June 1 till November 30, or in the southern hemisphere within a period selected from the periods ranging from June 1 till September 14, from September 15 till November 14, from November 15 till November 30, and from December 1 till May 31.

**Claim 72:** In a process according to claim 65, the improvement wherein said appropriate regions comprise the Californian region of the USA.

**Claim 73:** In a process according to claim 65, the improvement wherein the source material are chicory roots which have been grown and processed under the conditions as defined in claim 65, said process further comprising the steps of:

- (i) isolation of the inulin from the chicory roots yielding an aqueous solution of crude inulin,
- (ii) purification of the crude inulin obtained in step (i) yielding an aqueous solution of purified inulin, optionally followed by concentration of this solution by partial removal of the water yielding a purified inulin concentrate, and
- (iii) isolation in particulate form of the inulin from the aqueous solution or concentrate of purified inulin obtained in step (ii), thereby yielding, respectively, standard grade chicory inulin or improved standard grade chicory inulin.

**Claim 74:** In a process according to claim 73, the improvement comprising:

- for step (i): extraction with hot water of the inulin from fresh slices or shreds of the chicory roots, yielding an aqueous solution of crude inulin,
- for step (ii): purification of the aqueous solution of crude inulin obtained in step (i) by depuration followed by refining, and
- for step (iii): isolation of, respectively, standard grade chicory inulin or improved standard grade chicory inulin, in particulate form by spray drying.

**Claim 75:** In a process according to claim 65, for the manufacture of low sugar standard grade chicory inulin or improved low sugar standard grade chicory inulin containing in total less than

1 weight % monomeric saccharides and sucrose, by conventional techniques from chicory roots, the improvement wherein the source material are chicory roots which have been grown and processed under the conditions as defined in claim 65.

**Claim 76:** In a process according to claim 75, the improvement wherein, respectively, standard grade chicory inulin or improved standard grade chicory inulin or a corresponding intermediate purified inulin, obtained by a process defined in claim 65 is used as a source material and is, in accordance with known techniques, subjected to the following additional consecutive steps:

(iv) removal of the monomeric saccharides and sucrose, yielding a low sugar inulin solution or concentrate, and

(v) isolating the low sugar inulin in particulate form from the solution or concentrate obtained in step (iv),

and the product obtained is, respectively, low sugar standard grade chicory inulin with a mean ( $\overline{DP}$ ) of at least 10 or improved low sugar standard grade chicory inulin with a mean ( $\overline{DP}$ ) of at least 12, the mean ( $\overline{DP}$ ) being taken over a processing period of at least 60 days.

**Claim 77:** In a process according to claim 75, the improvement wherein, respectively, standard grade chicory inulin or improved standard grade chicory inulin or a corresponding intermediate purified inulin, obtained by a process defined in claim 68 is used as a source material and is, in accordance with known techniques, subjected to the following additional consecutive steps:

(iv) removal of the monomeric saccharides and sucrose, yielding a low sugar inulin solution or concentrate, and

(v) isolating the low sugar inulin in particulate form from the solution or concentrate obtained in step (iv),  
and the product obtained is, respectively, low sugar standard grade chicory inulin with a mean ( $\overline{DP}$ ) of at least 10 or improved low sugar standard grade chicory inulin with a mean ( $\overline{DP}$ ) of at least 12, the mean ( $\overline{DP}$ ) being taken over a processing period of at least 60 days.

**Claim 78:** In a process according to claim 75, the improvement wherein, respectively, standard grade chicory inulin or improved standard grade chicory inulin or a corresponding intermediate purified inulin, obtained by a process defined in claim 74 is used as a source material and is, in accordance with known techniques, subjected to the following additional consecutive steps:

(iv) removal of the monomeric saccharides and sucrose, yielding a low sugar inulin solution or concentrate, and

(v) isolating the low sugar inulin in particulate form from the solution or concentrate obtained in step (iv),  
and the product obtained is, respectively, low sugar standard grade chicory inulin with a mean ( $\overline{DP}$ ) of at least 10 or improved low sugar standard grade chicory inulin with a mean ( $\overline{DP}$ ) of at least 12, the mean ( $\overline{DP}$ ) being taken over a processing period of at least 60 days.

**Claim 79:** In a process according to claim 65, for the manufacture of high performance grade chicory inulin with a ( $\overline{DP}$ ) of at least 20, or improved high performance grade chicory inulin with a mean ( $\overline{DP}$ ), taken over a processing period of the chicory roots of at least 60 days, of at least 20, which are essentially free from low molecular monomeric saccharides, dimeric saccharides and oligofructose, and essentially free from colorings, salts, proteins, organic acids

and technological aids, the improvement wherein the source material are chicory roots which have been grown and processed under the conditions as defined in claim 65.

**Claim 80:** In a process according to claim 79, the improvement wherein standard grade chicory inulin with a ( $\overline{DP}$ ) of at least 12, respectively improved standard grade chicory inulin with a mean ( $\overline{DP}$ ), taken over a processing period of the chicory roots of at least 60 days, of at least 12, or its intermediate, depurated or refined inulin, obtained by a process defined in claim 65, is used as a source material and subjected, in accordance with known techniques, to the following consecutive steps:

(vi) fractionation, and

(vii) isolation in particulate form of the high performance grade inulin from the fractionated product obtained in step (vi),

thereby providing high performance grade chicory inulin, respectively improved high performance grade chicory inulin in a yield of at least 40% based on the source inulin.

**Claim 81:** In a process according to claim 80, the improvement wherein standard grade chicory inulin with a ( $\overline{DP}$ ) of at least 12, respectively improved standard grade chicory inulin with a mean ( $\overline{DP}$ ), taken over a processing period of the chicory roots of at least 60 days, of at least 12, or its intermediate, depurated or refined inulin, obtained by a process defined in claim 73, is used as a source material and subjected, in accordance with known techniques, to the following consecutive steps:

(vi) fractionation, and

(vii) isolation in particulate form of the high performance grade inulin from the fractionated product obtained in step (vi),

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thereby providing high performance grade chicory inulin, respectively improved high performance grade chicory inulin in a yield of at least 40% based on the source inulin.

**Claim 82:** In a process according to claim 80, the improvement wherein standard grade chicory inulin with a ( $\overline{DP}$ ) of at least 12, respectively improved standard grade chicory inulin with a mean ( $\overline{DP}$ ), taken over a processing period of the chicory roots of at least 60 days, of at least 12, or its intermediate, depurated or refined inulin, obtained by a process defined in claim 74, is used as a source material and subjected, in accordance with known techniques, to the following consecutive steps:

(vi) fractionation, and

(vii) isolation in particulate form of the high performance grade inulin from the fractionated product obtained in step (vi),

thereby providing high performance grade chicory inulin, respectively improved high performance grade chicory inulin in a yield of at least 40% based on the source inulin.

**Claim 83:** In a process according to claim 80, the improvement wherein the fractionation is carried out by directed crystallization of an aqueous metastable solution of the source material, and the isolation of the fractionated inulin in particulate form is carried out by filtration or centrifuging including washing with water.

**Claim 84:** In a process according to claim 81, the improvement wherein the fractionation is carried out by directed crystallization of an aqueous metastable solution of the source material, and the isolation of the fractionated inulin in particulate form is carried out by filtration or centrifuging including washing with water.

**Claim 85:** In a process according to claim 82, the improvement wherein the fractionation is carried out by directed crystallization of an aqueous metastable solution of the source material,

and the isolation of the fractionated inulin in particulate form is carried out by filtration or centrifuging including washing with water.

**Claim 86:** In a process according to claim 80, the improvement wherein the source inulin has a ( $\overline{DP}$ ), respectively a mean ( $\overline{DP}$ ) of at least 14, and the high performance grade chicory inulin, respectively improved high performance grade chicory inulin, is obtained in a yield of at least 45% based on the source material, and has a ( $\overline{DP}$ ), respectively a mean ( $\overline{DP}$ ), of at least 20, the mean ( $\overline{DP}$ ) being taken over a processing period of the source chicory roots of at least 60 days.

**Claim 87:** In a process according to claim 81, the improvement wherein the source inulin has a ( $\overline{DP}$ ), respectively a mean ( $\overline{DP}$ ) of at least 14, and the high performance grade chicory inulin, respectively improved high performance grade chicory inulin, is obtained in a yield of at least 45% based on the source material, and has a ( $\overline{DP}$ ), respectively a mean ( $\overline{DP}$ ), of at least 20, the mean ( $\overline{DP}$ ) being taken over a processing period of the source chicory roots of at least 60 days.

**Claim 88:** In a process according to claim 82, the improvement wherein the source inulin has a ( $\overline{DP}$ ), respectively a mean ( $\overline{DP}$ ) of at least 14, and the high performance grade chicory inulin, respectively improved high performance grade chicory inulin, is obtained in a yield of at least 45% based on the source material, and has a ( $\overline{DP}$ ), respectively a mean ( $\overline{DP}$ ), of at least 20, the mean ( $\overline{DP}$ ) being taken over a processing period of the source chicory roots of at least 60 days.

**Claim 89:** In a process for the manufacture of a partial hydrolysate of chicory inulin, by conventional techniques from chicory roots, the improvement wherein the source material are



chicory roots which have been grown and processed under the conditions as defined in claim 65 and the product obtained is polydisperse oligofructose.

**Claim 90:** In a process according to claim 89, the improvement wherein respectively, standard grade or improved standard grade chicory inulin or the corresponding intermediates, depurated or refined inulin, obtained by a process defined in claim 65, is used as a source material, and the product obtained is polydisperse oligofructose containing at least 90% by weight dry substance and the oligofructose has a degree of polymerization (*DP*) from 2 to 10.

**Claim 91:** In a process according to claim 90, the improvement wherein respectively, standard grade or improved standard grade chicory inulin or the corresponding intermediates, depurated or refined inulin, obtained by a process defined in claim 73, is used as a source material, and the product obtained is polydisperse oligofructose containing at least 90% by weight dry substance and the oligofructose has a (*DP*) from 2 to 10.

**Claim 92:** In a process according to claim 90, the improvement wherein respectively, standard grade or improved standard grade chicory inulin or the corresponding intermediates, depurated or refined inulin, obtained by a process defined in claim 74, is used as a source material, and the product obtained is polydisperse oligofructose containing at least 90% by weight dry substance and the oligofructose has a (*DP*) from 2 to 10.

**Claim 93:** In a process for the manufacture of a complete hydrolysate of chicory inulin, by conventional techniques from chicory roots, the improvement wherein the source material are chicory roots which have been grown and processed under the conditions as defined in claim 65, and the product obtained is fructose.

**Claim 94:** In a process according to claim 93, the improvement wherein, respectively, standard grade or improved standard grade inulin or the corresponding intermediate, depurated

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or refined inulin, obtained by a process defined in claim 65, is used as a source material, and the product obtained is fructose containing at least 89% by weight fructose, calculated on dry substance.

**Claim 95:** In a process according to claim 93, the improvement wherein, respectively, standard grade or improved standard grade inulin or the corresponding intermediate, depurated or refined inulin, obtained by a process defined in claim 73, is used as a source material, and the product obtained is fructose containing at least 89% by weight fructose, calculated on dry substance.

**Claim 96:** In a process according to claim 93, the improvement wherein, respectively, standard grade or improved standard grade inulin or the corresponding intermediate, depurated or refined inulin, obtained by a process defined in claim 74, is used as a source material, and the product obtained is fructose containing at least 89% by weight fructose, calculated on dry substance.

**Claim 97:** In a process for the manufacture of a derivative of chicory inulin, by conventional techniques from chicory inulin or an intermediate thereof, the improvement wherein the source material for the inulin are chicory roots which have been grown and processed under the conditions as defined in claim 65.

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**EVIDENCE APPENDIX**

**Appendix A:** KMI Herent

**Appendix B:** Map of Applicable Region

**Appendix C:** Distance between Herent and Heverlee

**Appendix D:** Distance between Ukkel and Heverlee

**Appendix E:** Altitudes of Herent, Ukkel, Heverlee

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**RELATED PROCEEDINGS APPENDIX**

Appendix A: Appeal No. 2004-1498

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Ref.: TIENSE RAFF.26 PRAFF 26/US.w Attachment Letter JH-2-5-231 of Sept. 29, 2005  
Pat. Appl. USSN 09/600,732

DOC. 1A

TRANSLATION OF E-MAIL

Subject : Climatologically data Herent  
Date sent : 21 september 2005, 16:07:32  
From : Walter Boon [wboon@bdb.be](mailto:wboon@bdb.be)  
To : Johny Hermans <[johny.Hermans@orafti.com](mailto:johny.Hermans@orafti.com)>

Dear Mr. Hermans,

In attachment the file with the climatologically data (Tmin and Tmax, daily) from the station of Herent for the year 1994.  
Invoice follows.

Best Regards,

Walter Boon

Bodemkundige Dienst van België (= Soil Science Institute of Belgium)  
Willem de Croylaan 48  
3001 Heverlee  
Phone : + 32 16 31 09 22  
Fax : + 32 16 22 42 06  
.....

-----  
HERENT

OBSERVATIONS OF THE CLIMATOLOGICALLY STATION HERENT (FS33) OF THE K.M.I.

Lambert coordinates station Herent (X : 169929 Y : 177100)  
The observations are carried out at 8 h. local time.  
Source : Bodemkundige Dienst van België, Heverlee. \*  
\* : = Soil Science Institute of Belgium, Heverlee

Date	Tmax (°C)	Tmin (°C)
------	-----------	-----------

.....

## HERENT

## WAARNEMINGEN VAN HET KLIMATOLOGISCH STATION HERENT (FS33) VAN HET K.M.I.

Lambertcoördinaten station Herent (X:169929 Y:177100)

De waarnemingen worden verricht om 8u lokale tijd.

Bron : Bodemkundige Dienst van België. Heverlee.

DATUM Tmax (°C) Tmin (°C)

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5	1	1994	9.4	3.5
6	1	1994	8.4	5.0
7	1	1994	5.5	4.0
8	1	1994	6.2	.9
9	1	1994	6.1	-1.4
10	1	1994	6.8	1.1
11	1	1994	8.0	4.5
12	1	1994	13.4	5.0
13	1	1994	10.9	7.9
14	1	1994	8.8	6.8
15	1	1994	5.7	3.9
16	1	1994	5.5	-1.4
17	1	1994	2.2	-4.0
18	1	1994	3.4	-3.9
19	1	1994	2.8	.0
20	1	1994	5.3	.1
21	1	1994	6.0	-.4
22	1	1994	10.1	2.6
23	1	1994	10.6	5.8
24	1	1994	10.2	4.3
25	1	1994	11.5	4.7
26	1	1994	8.6	4.8
27	1	1994	11.0	5.2
28	1	1994	6.4	3.8
29	1	1994	7.6	.0
30	1	1994	8.5	1.0
31	1	1994	8.2	2.8
1	2	1994	8.0	2.5
2	2	1994	7.5	3.4
3	2	1994	7.9	1.4
4	2	1994	7.8	2.5
5	2	1994	7.4	3.4
6	2	1994	9.3	3.7
7	2	1994	7.8	1.9
8	2	1994	7.6	2.5
9	2	1994	6.8	1.4
10	2	1994	7.8	3.9
11	2	1994	5.4	2.0
12	2	1994	4.1	.9
13	2	1994	.2	-1.1
14	2	1994	-.2	-7.4
15	2	1994	3.6	-5.9
16	2	1994	8.2	-1.0
17	2	1994	3.8	-6.3
18	2	1994	6.0	-6.4
19	2	1994	5.9	-5.8

## HERENT

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27	2	1994	12.7	7.3
28	2	1994	13.8	6.9
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2	3	1994	9.6	3.1
3	3	1994	10.7	2.8
4	3	1994	11.6	2.7
5	3	1994	15.2	2.7
6	3	1994	11.0	3.5
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9	3	1994	15.8	9.4
10	3	1994	12.0	7.7
11	3	1994	13.4	-.9
12	3	1994	11.0	2.0
13	3	1994	12.0	6.2
14	3	1994	11.9	6.2
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16	3	1994	9.2	4.3
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22	3	1994	10.5	-1.3
23	3	1994	14.0	.8
24	3	1994	13.4	10.3
25	3	1994	12.1	7.4
26	3	1994	9.3	4.4
27	3	1994	10.5	-1.5
28	3	1994	13.6	-1.3
29	3	1994	15.2	7.2
30	3	1994	20.7	8.9
31	3	1994	14.4	8.0
1	4	1994	11.9	7.9
2	4	1994	8.9	4.4
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4	4	1994	13.6	2.2
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8	4	1994	10.0	2.4
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10	4	1994	11.2	-.2
11	4	1994	14.1	1.3
12	4	1994	15.2	4.0
13	4	1994	12.7	5.3
14	4	1994	10.3	4.6
15	4	1994	10.2	2.8
16	4	1994	15.8	5.1
17	4	1994	12.8	5.4
18	4	1994	12.0	2.7
19	4	1994	11.8	-1.1

## HERENT

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24	4	1994	20.7	9.2
25	4	1994	15.3	9.9
26	4	1994	16.2	6.2
27	4	1994	17.8	9.3
28	4	1994	21.2	12.2
29	4	1994	24.2	8.7
30	4	1994	22.2	11.4
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2	5	1994	17.3	.6
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5	5	1994	15.0	7.7
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10	5	1994	17.2	5.3
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12	5	1994	20.4	9.2
13	5	1994	21.9	8.8
14	5	1994	20.6	10.4
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18	5	1994	19.8	8.3
19	5	1994	17.1	9.4
20	5	1994	16.2	6.2
21	5	1994	19.8	10.0
22	5	1994	17.5	11.7
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24	5	1994	15.8	8.2
25	5	1994	15.8	10.1
26	5	1994	13.2	10.1
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6	6	1994	15.0	8.5
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17	6	1994	21.9	12.7



## HERENT

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23	7	1994	30.9	15.9
24	7	1994	35.2	16.8
25	7	1994	27.8	19.2
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## HERENT

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9	9	1994	16.6	10.5
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9	10	1994	16.2	3.0
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19	10	1994	17.2	.7
20	10	1994	16.9	5.2
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22	10	1994	16.0	8.3
23	10	1994	16.7	12.6
24	10	1994	14.7	8.9
25	10	1994	13.3	7.9
26	10	1994	13.1	6.9
27	10	1994	9.7	6.7
28	10	1994	12.8	5.8
29	10	1994	13.9	4.6
30	10	1994	15.6	5.5
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2	11	1994	13.6	3.9
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29	11	1994	8.1	6.7
30	11	1994	4.3	1.0
1	12	1994	6.5	-1.0
2	12	1994	7.6	-1.3
3	12	1994	13.4	-1.2
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7	12	1994	10.7	4.6
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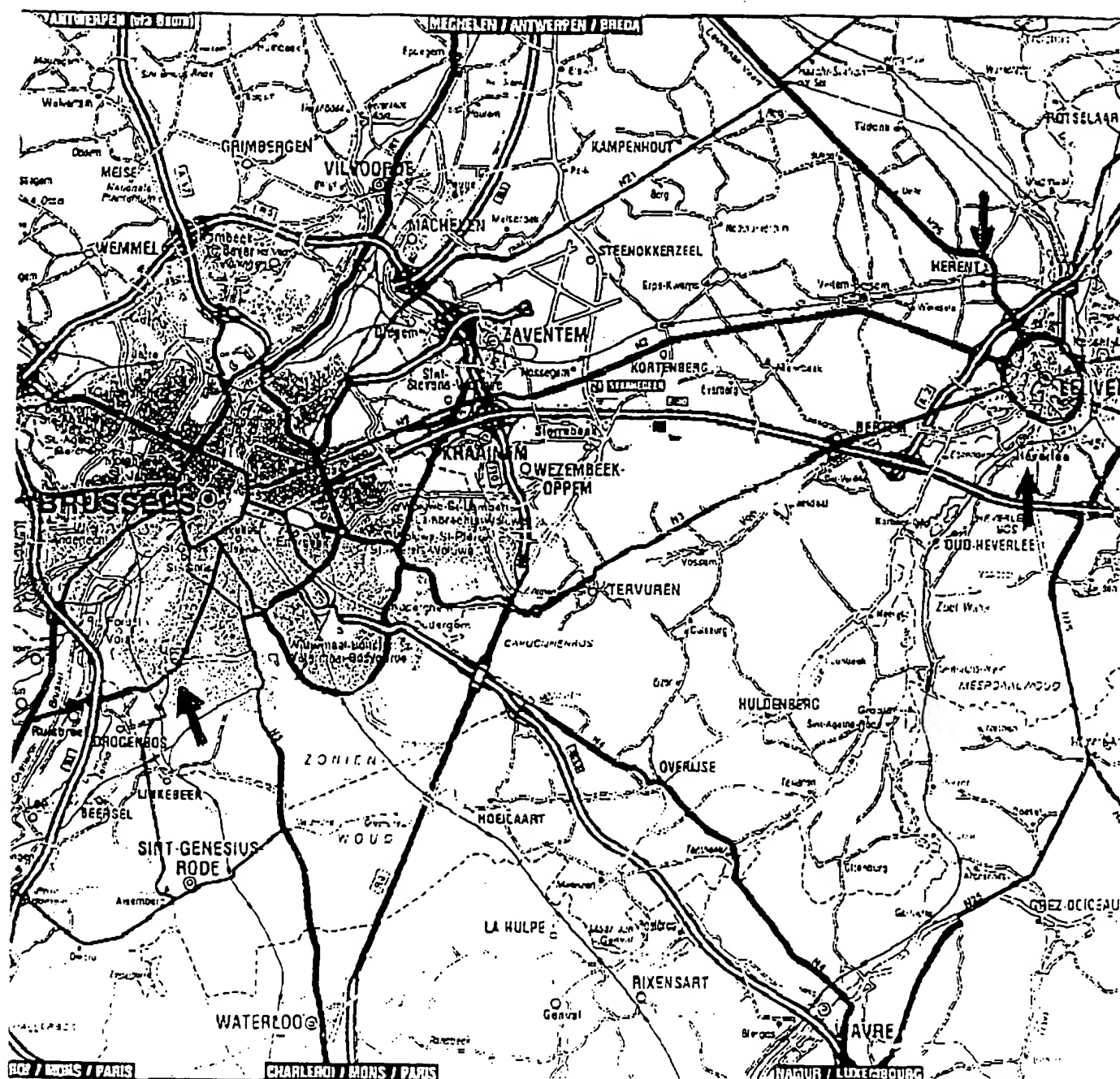
## HERENT

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17	12	1994	6.5	2.7
18	12	1994	7.4	2.3
19	12	1994	8.1	2.8
20	12	1994	6.1	1.2
21	12	1994	5.1	.4
22	12	1994	3.1	.6
23	12	1994	2.1	-1.8
24	12	1994	-3.1	-6.5
25	12	1994	.8	-5.6
26	12	1994	10.6	-3.6
27	12	1994	13.0	.7
28	12	1994	13.8	9.8
29	12	1994	11.8	10.7
30	12	1994	8.1	6.5
31	12	1994	6.5	5.0

Ref: TIENSE RAFF.26 PRAFF 26/US.w Attachment Letter JH-2-5-231 of Sept. 29, 2005  
 Pat. Appl. USSN 09/600,732

BEST AVAILABLE COPY

Doc 2





START

Herent, Vlaanderen BE

END

Heverlee, Vlaanderen BE

Total Est. Time:

9 minutes

Total Est. Distance:

4.10 miles

Maneuvers	Distance
<div>START</div> 1: Start out going NORTHEAST on ONZE-LIEVE-VROUWSTRAAT toward OUD-STRIJDESSTRAAT.	0.1 miles
<div></div> 2: Turn SHARP RIGHT onto OMLEIDING / N26. Continue to follow N26.	1.6 miles
<div></div> 3: Turn SLIGHT RIGHT onto MECHELSEPOORT.	0.1 miles
<div></div> 4: Turn SLIGHT RIGHT onto DEN BOSCHSINGEL / R23. Continue to follow R23.	1.1 miles
<div></div> 5: Keep LEFT at the fork to continue on R23.	0.5 miles
<div></div> 6: Turn SLIGHT RIGHT onto NAAMSESTEENWEG / N251.	0.4 miles
<div>END</div> 7: End at Heverlee, Vlaanderen BE	

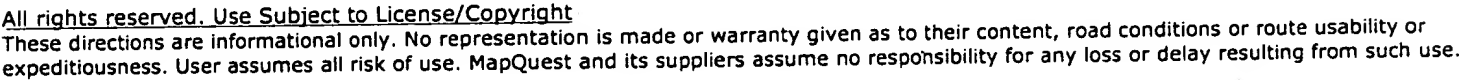
Total Est. Time:

9 minutes

Total Est. Distance:














4.10 miles

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or 5.2 cm ; approximate distance between  
Hereon and Haverlee as the  
crow flies is 4.33 km

**START** Ukkel, Brussel BE**END** Heverlee, Vlaanderen BE**Total Est. Time:**  
31 minutes**Total Est. Distance:**  
19.70 miles**Maneuvers****Distance**

- |  |  |            |
|--|--|------------|
|    | <b>1:</b> Start out going WEST on AVENUE DOCTEUR DECROLY / DOKTER DECROLYLAAN toward AVENUE DE L'AULNE / ELZEBOOMLAAN.   | <0.1 miles |
|    | <b>2:</b> Turn RIGHT onto AVENUE DE L'AULNE / ELZEBOOMLAAN.  | 0.1 miles  |
|    | <b>3:</b> Turn RIGHT onto RUE ALPHONSE ASSELBERGS / ALPHONSE ASSELBERGSSTRAAT.   | 0.2 miles  |
|    | <b>4:</b> Turn LEFT onto CHAUSSÉE D'ALSEMBERG / ALSEMBERGSESTEENWEG.   | 1.5 miles  |
|   | <b>5:</b> Enter next roundabout and take 3rd exit onto RUE DE L'HÔTEL DES MONNAIES / MUNTTHOFSTRAAT / N5C.   | 0.5 miles  |
|  | <b>6:</b> Turn RIGHT onto AVENUE DE LA TOISON D'OR / GULDEN-VLIESLAAN / R20A.  | <0.1 miles |
|  | <b>7:</b> Turn SLIGHT LEFT onto ramp.  | <0.1 miles |
|  | <b>8:</b> Turn SLIGHT RIGHT onto R20.  | 0.6 miles  |
|  | <b>9:</b> Turn SLIGHT RIGHT onto ramp.   | 0.1 miles  |
|  | <b>10:</b> Stay STRAIGHT to go onto KUNSTLAAN / AVENUE DES ARTS.   | <0.1 miles |
|  | <b>11:</b> Turn RIGHT onto N23.  | 0.4 miles  |
|  | <b>12:</b> Turn SLIGHT LEFT onto BELLIARD-CORTENBERGHTUNNEL / TUNNEL BELLIARD-CORTENBERGH / N23B. Continue to follow BELLIARD-CORTENBERGHTUNNEL / TUNNEL BELLIARD-CORTENBERGH. | 1.1 miles  |
|  | <b>13:</b> BELLIARD-CORTENBERGHTUNNEL / TUNNEL BELLIARD-CORTENBERGH becomes N23.   | 0.4 miles  |



- 
-  **14:** Merge onto E40 toward LIÈGE / LUIK. 9.9 miles
- 
-  **15:** Merge onto E314 toward GENK / HASSELT / LEUVEN. 1.2 miles
- 
-  **16:** Merge onto KONING BOUDEWIJNLAAN / N264 via EXIT 15 toward LEUVEN. 2.0 miles
- 
-  **17:** Take the exit. 0.4 miles
- 
-  **18:** Turn SLIGHT RIGHT onto NAAMSESTEENWEG / N251. 0.4 miles
- 
-  **19:** End at Heverlee, Vlaanderen BE
- 

**Total Est. Time:** 31 minutes      **Total Est. Distance:** 19.70 miles



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$\sim 7.0 \text{ cm}$  (Ukkel + Hecetlee) ; Ukkel + Hecetlee is approximately 28 km as the crow flies.

$4\text{ km} \approx 1\text{ cm}$  (to scale)

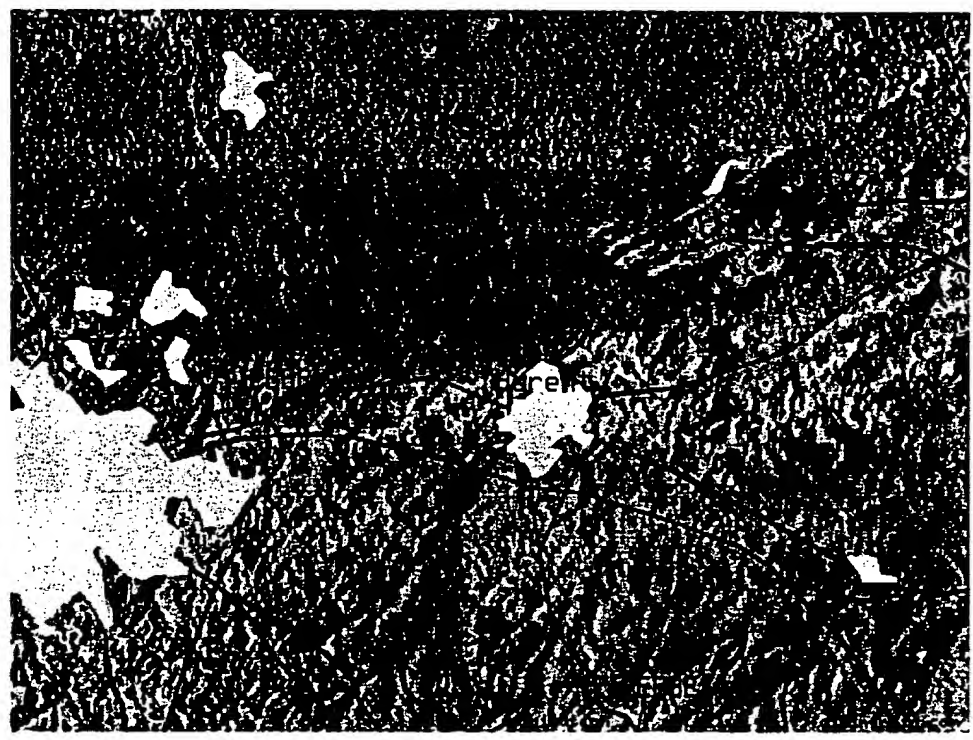
# Herent, Belgium Page

World:Belgium:Province de )) (( Brabant

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Lat (DMS)	50° 53' 60N	Long (DMS)	4° 40' 0E	Altitude (meters)	59
Time zone (est)		UTC+1(+2DT)			

Approximate population for 7 km radius from this point: 88850

Google links for Herent	Google links for Herent, Belgium
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2X in      1.4X in      1.4X out      2X out      Topo      Satellite      2-D  
0.1768 degrees: [North](#)      [South](#)      [East](#)      [West](#)



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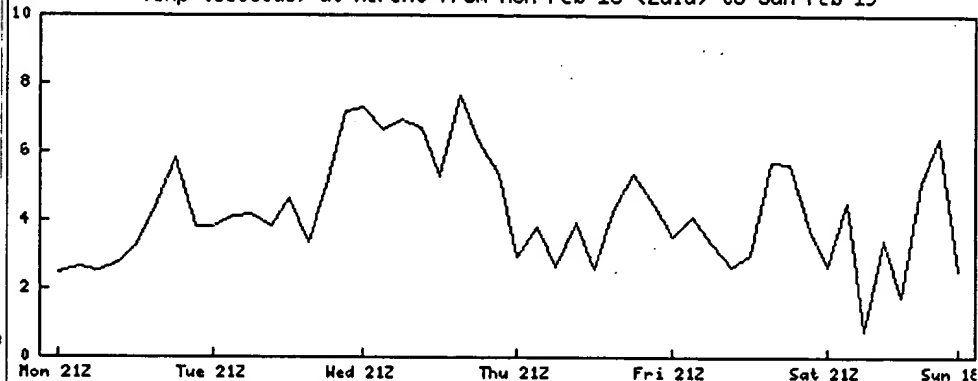
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West	North	East	South
<u>Winksele</u> (0.6 nm)	<u>Doren</u> (1.0 nm)	<u>Kareelveld</u> (0.6 nm)	<u>IJzerenberg</u> (1.2 nm) <u>Egenhoven</u> (2.0 nm)

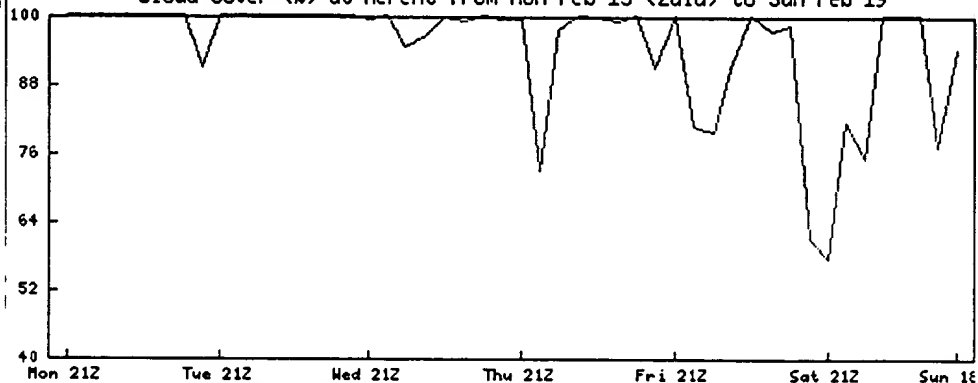
Nearby airports:

Code	IATA	Name	City	Distance	Bearing	Airlines
<u>EBBR</u>	BRU	BRUSSELS NATL		6 nm W	270	<u>Check</u>
<u>EBBE</u>		BEAUVECHAIN		9 nm S	155	
<u>EBZR</u>		ZOERSEL		22 nm N	8	
<u>EBAW</u>	ANR	DEURNE	Antwerpen	19 nm N	335	<u>Check</u>

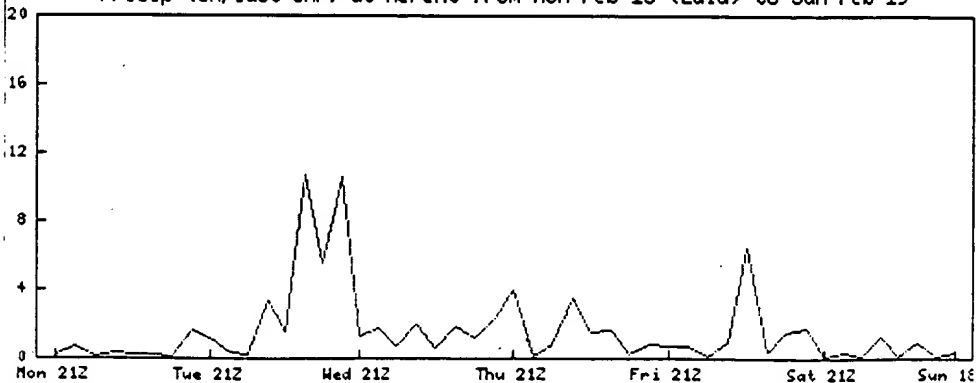
Temp (Celsius) at Herent from Mon Feb 13 (Zulu) to Sun Feb 19



Cloud Cover (%) at Herent from Mon Feb 13 (Zulu) to Sun Feb 19



Precip (cm/last 3hr) at Herent from Mon Feb 13 (Zulu) to Sun Feb 19



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# Heverlee, Belgium Page

Other names: Heverle

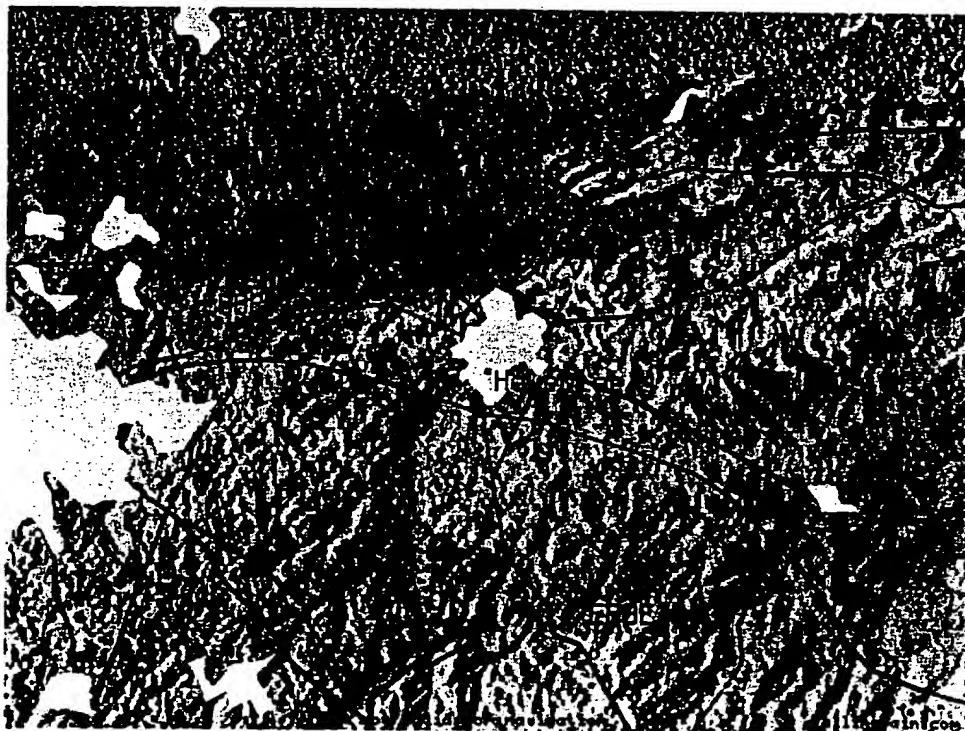
World:Belgium:Province de )) (( Brabant

<b>Latitude</b>	50.8667	<b>Longitude</b>	4.7000	<b>Altitude (feet)</b>	111
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<b>Time zone (est)</b>	UTC+1(+2DT)				

Approximate population for 7 km radius from this point: 78386

Google links for Heverlee

Google links for Heverlee, Belgium

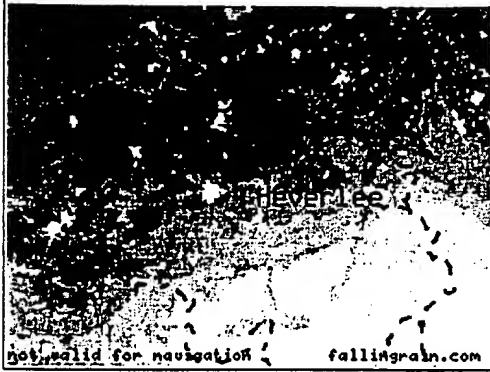


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 0.1768 degrees: [North](#)    [South](#)    [East](#)    [West](#)

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### Nearby Cities and Towns

West

North

East

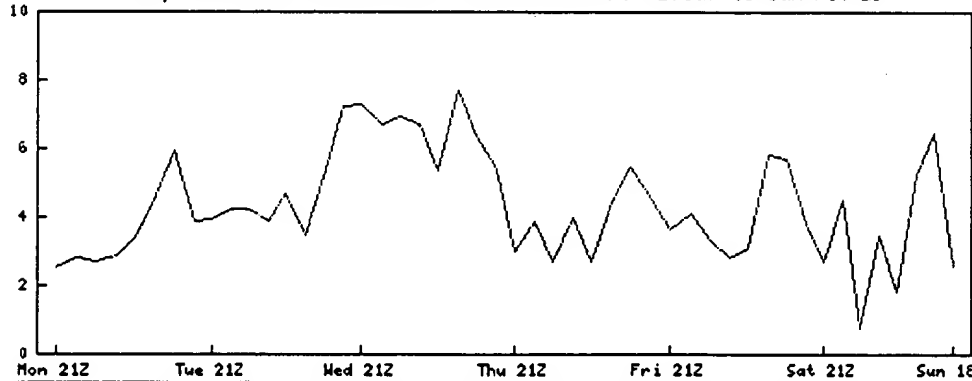
South

		Den Duivel (1.6 nm)	
		Leutsberg (1.6 nm)	
<u>Terbank</u> (0.6 nm)	<u>Leuven</u> (1.0 nm)	<u>Molenberg</u> (1.6 nm)	<u>Vaalbeek</u> (2.1 nm)
	<u>Blauwput</u> (1.2 nm)	<u>Korbeek-Lo</u> (1.3 nm)	<u>Blanden</u> (2.1 nm)
		<u>Pietersberg</u> (1.3 nm)	
		<u>Predikherenberg</u> (1.3 nm)	

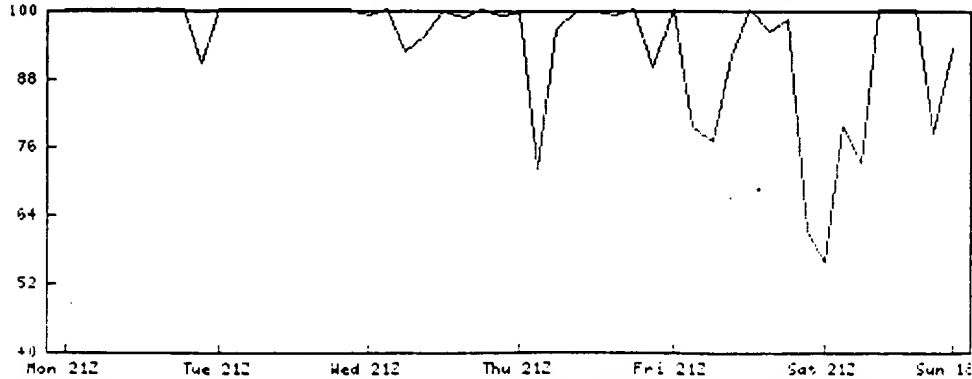
### Nearby airports:

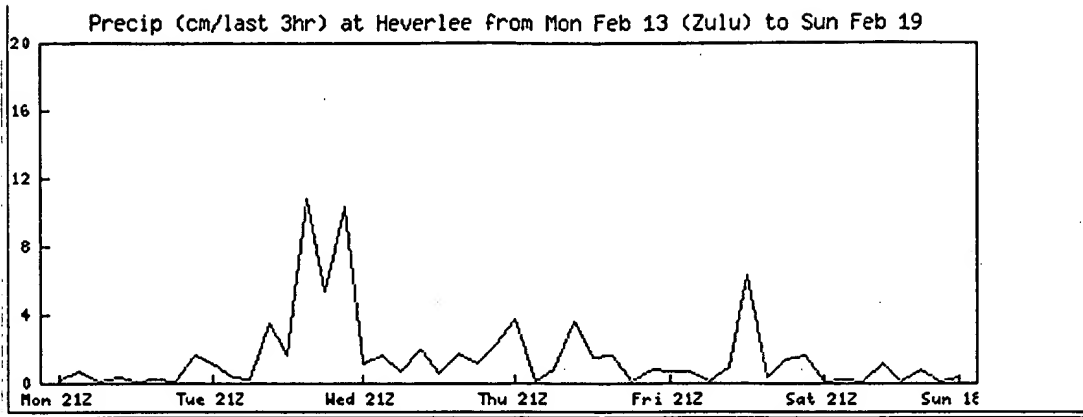
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<u>EBBE</u>		BEAUVECHAIN		6 nm	S 158	
<u>EBBR</u>	BRU	BRUSSELS NATL		8 nm	W 284	<u>Check</u>
<u>EBZR</u>		ZOERSEL		23 nm	N 4	
<u>EBAW</u>	ANR	DEURNE	Antwerpen	21 nm	N 335	<u>Check</u>

Temp (Celsius) at Heverlee from Mon Feb 13 (Zulu) to Sun Feb 19



Cloud Cover (%) at Heverlee from Mon Feb 13 (Zulu) to Sun Feb 19





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# Ukkel, Belgium Page

Other names: Uccle

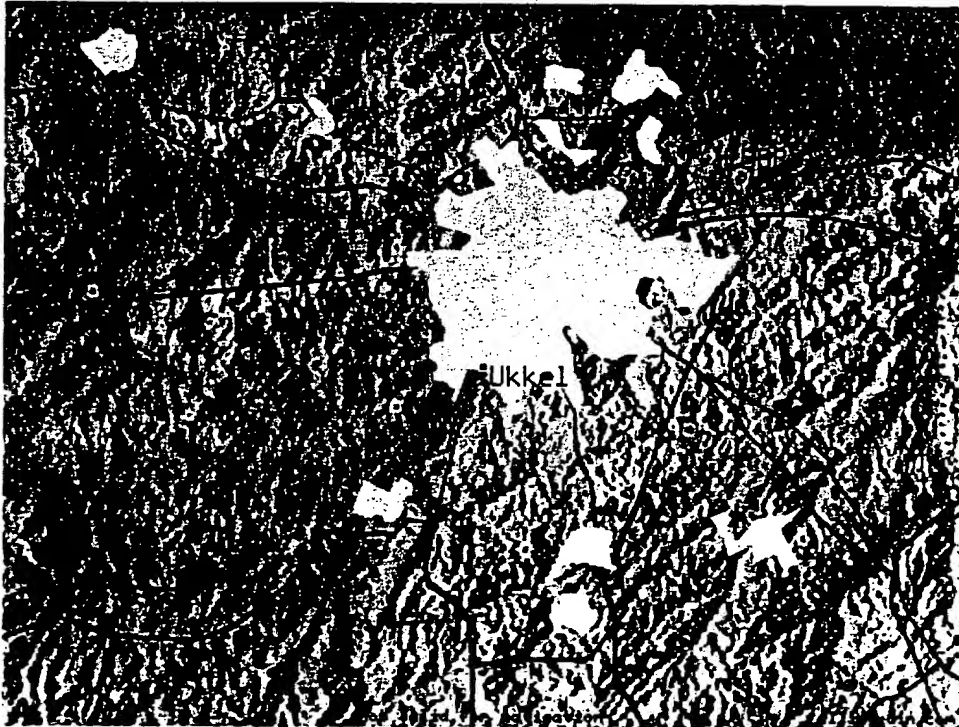
World:Belgium:Province de )) (( Brabant

Latitude	50.8000	Longitude	4.3167	Altitude (feet)	134
Lat (DMS)	50° 47' 60N	Long (DMS)	4° 19' 0E	Altitude (meters)	40
Time zone (est)		UTC+1(+2DT)			

Approximate population for 7 km radius from this point: 408915

Google links for Ukkel

Google links for Ukkel, Belgium



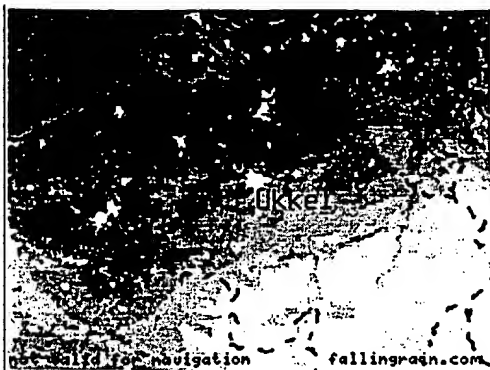
[2X in](#)
[1.4X in](#)
[1.4X out](#)
[2X out](#)
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 0.1768 degrees: [North](#) [South](#) [East](#) [West](#)

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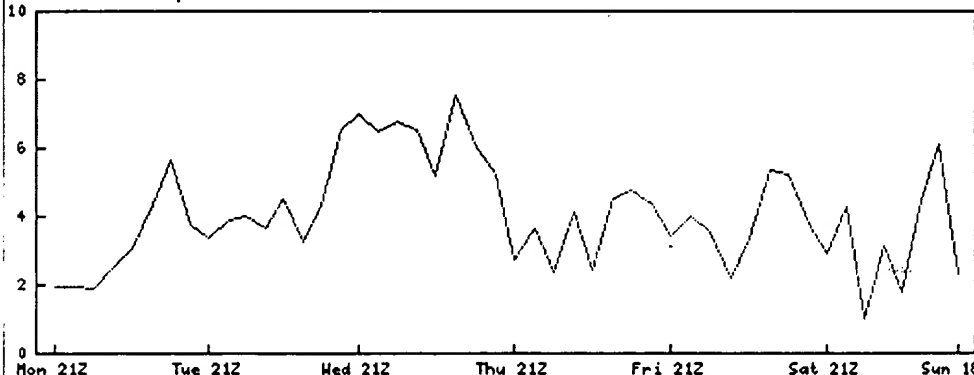
### Nearby Cities and Towns

West	North	East	South
Neerstalle (0.6 nm)	Anderlecht (2.1 nm) Veeweide (2.1 nm) Sint-Gillis (1.2 nm)	Stalle (0.6 nm) Vossegat (0.6 nm)	Calevoet (1.0 nm) Drogenbos (1.0 nm)

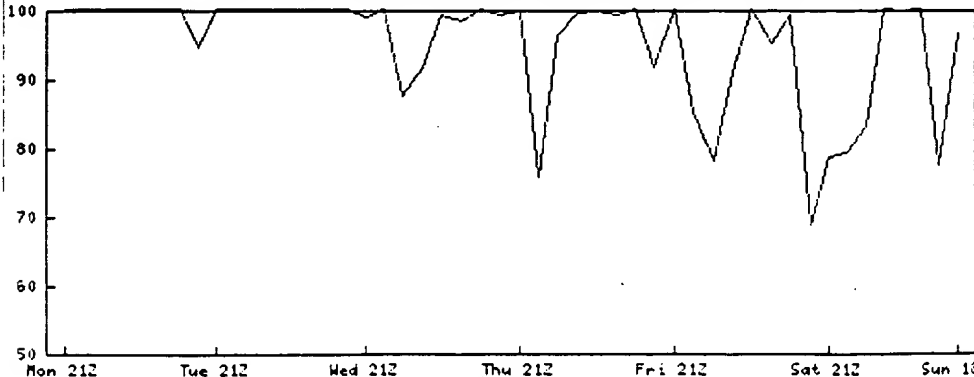
### Nearby airports:

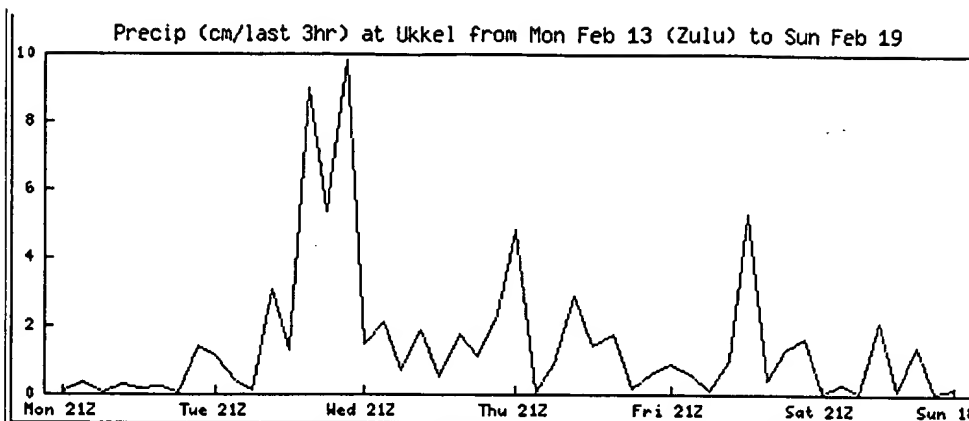
Code	IATA	Name	City	Distance	Bearing	Airlines
<u>EBBR</u>	BRU	BRUSSELS NATL		8 nm	E 46	<u>Check</u>
<u>EBCI</u>	CRL	BRUSSELS SOUTH	Charleroi	21 nm	S 165	<u>Check</u>
<u>EBBE</u>		BEAUVECHAIN		17 nm	E 98	
<u>EBAW</u>	ANR	DEURNE	Antwerpen	23 nm	N 13	<u>Check</u>

Temp (Celsius) at Ukkel from Mon Feb 13 (Zulu) to Sun Feb 19



Cloud Cover (%) at Ukkel from Mon Feb 13 (Zulu) to Sun Feb 19





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The opinion in support of the decision being entered today, not written  
for publication and is not binding precedent of the Board.

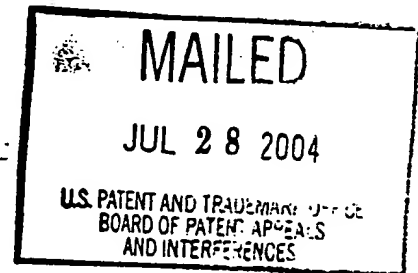
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

Ex parte GEORGES SMITS, and LEEN DE LEENHEER

Appeal No. 2004-1498  
Application No. 09/600,732

ON BRIEF



Before SCHEINER, ADAMS, and GREEN, Administrative Patent Judges.

ADAMS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the  
examiner's final rejection of claims 65-70 and 72-97, which are all the claims  
pending in the application.

Claim 65 is illustrative of the subject matter on appeal and is reproduced  
below:

65. In a process for the manufacture of chicory inulin from chicory roots through conventional manufacturing techniques, the improvement which comprises:
- using as a source material for the process roots of chicory which have been grown in appropriate regions and have been seeded, grown and processed under climatological temperature conditions which are such that during a period of at least from the beginning of the third month of the growing period till the end of the processing of the chicory roots the fructan exohydrolase (FEH) gene in the chicory roots has not been triggered by the occurrence of low temperature conditions which

are such that the temperature in a thermometer shelter shall not have dropped below minus 1°C,

- said chicory roots have had a growing period of at least 150 days,
- said chicory has been seeded
  - in the northern hemisphere within a period selected from the periods ranging from December 1 till March 14, from March 15 till May 14, from May 15 till May 31, from June 1 till June 14, and from June 15 till November 30, provided that when said chicory has been seeded in the periods from May 15 till May 31, and from June 1 till June 14, the chicory roots have had a growing period of at least 180 days, and provided that when said chicory has been seeded in the period from March 15 till May 14, the chicory roots have been grown and processed under climatological conditions wherein, within a period of at least 220 consecutive days immediately preceding the end of the processing of the roots, no low temperature conditions occurred which triggered the FEH gene, and the chicory roots have had a minimum growing period of at least 160 days,
  - in the southern hemisphere within a period selected from the periods ranging from June 1 till September 14, from September 15 till September 30, from October 1 till November 14, from November 15 till November 30, and from December 1 till May 31.

The references relied upon by the examiner are:

Yamazaki et al. (Yamazaki)	4,613,377	Sep. 23, 1986
Van Loo et al. (Van Loo)	5,660,872	Aug. 26, 1997

Van Den Ende et al. (Van Den Ende), "Fructan Synthesizing and Degrading Activities in Chicory Roots (Cichorium intybus L.) during Field-growth, Storage and Forcing," Plant Phys., Vol. 149, pp. 43-50 (1996)

### GROUND OF REJECTION<sup>1</sup>

Claims 65-70, 72-78, and '89-97<sup>2</sup> stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende.

Claims 79-88 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende and Van Loo.

We reverse.

### BACKGROUND

"Inulin is a carbohydrate which occurs in many plants and which can be produced by certain bacteria." Specification, page 1. According to the specification (id.):

Inulin can be generally represented, depending from the terminal carbohydrate unit, by the general formulae  $GF_n$  and  $F_m$ , wherein G represents a glucose unit, F represents a fructose unit, n is an integer representing the number of fructose units linked to the terminal glucose unit, and m is an integer representing the number of fructose units linked to each other in the carbohydrate chain.

The number of saccharide units (fructose and glucose units) in one molecule, i.e. the values  $n+1$  and m in the above formulae, are commonly referred to as the degree of polymerisation [sic], represented by (DP).

---

<sup>1</sup> The Answer sets forth a rejection of claims 65-97 under 35 U.S.C. § 112, second paragraph. Answer, page 3. However, on page 9 of the Answer, the examiner indicates that appellants' "arguments [with respect to the rejection under 35 U.S.C. § 112, second paragraph] have been considered and found persuasive and the rejection will fall." We interpret this statement as the rejection under 35 U.S.C. § 112, second paragraph has been withdrawn by the examiner. Accordingly, we have not considered this ground of rejection in our deliberations.

<sup>2</sup> We note that the examiner's statement of the rejection includes claim 71. However, as appellants explain (Brief, page 2), "[c]laim 71 was cancelled in an after final amendment which was entered by the [e]xaminer." According to the examiner (Answer, page 2), "[t]he statement of the status of the claims contained in the brief is correct." Accordingly, we have not considered claim 71 in our deliberations.

The "[m]ain plant sources for inulin are roots of Chicory (Cichorium intybus) and tubers from Dahlia and Jerusalem artichoke...." Id. "Inulin can be readily extracted from these plant parts, purified and optionally fractionated to remove impurities, mono- and disaccharides and undesired oligosaccharides, in order to provide various grades of inulin." Id. According to the specification (bridging paragraph, pages 8-9),

Chicory is conventionally cultivated in certain northern parts of Western Europe, where it is seeded in Spring (usually in April) and the roots are harvested, stored and processed for inulin production [in] late Autumn, usually from about mid September to about [the] end [of] November.... The whole growing and processing period covers about 150 to about 230 days. ... The end of the growing season is the time when the biomass of the roots ceases to increase significantly (i.e. after about 180 to about 200 days of growing), which usually corresponds to the end of October. Towards the end of the growing season, the (DP) and punctual [or average<sup>3</sup>] ( $\overline{DP}$ ) of the inulin in roots remaining in the soil, as well as in harvested and stored roots, are decreasing with time, and the rate of decrease is usually significantly increased from about [the] begin[ing of] November. This situation considerably limits the periods for growing (including seeding and growing) and for processing, including harvesting (harvesting period and harvesting as such), storage, and processing as such, of the chicory roots for the production of inulin, hydrolysates and derivatives of inulin in a technically and economically attractive manner.

Consequently, in spite of the fact that the manufacture of inulin from chicory roots constitutes the most important route to inulin, said manufacture is nevertheless confronted with considerable hurdles and problems, including[, inter alia,] the limited period, including limitations in duration of the period as well as in time period of the year, during which chicory roots can be seeded, grown, harvested, stored and processed for the manufacture of inulin in a technically and economically attractive manner and/or without undergoing a significant decrease of the ( $\overline{DP}$ ) of the inulin in the roots.

---

<sup>3</sup> See specification, bridging paragraph, pages 1-2, wherein the symbol " $\overline{DP}$ " is identified as the average degree of polymerization

Thus, according to the specification (bridging paragraph, pages 9-10), "the invention aims to provide a process for the manufacture of chicory inulin, partial hydrolysates, complete hydrolysates and derivatives of inulin, from chicory roots with a growing and/or a processing period which partially or wholly falls outside the conventional ones.

The claims are written in Jepson format. When a claim of this type is asserted, a determination of whether the implied admission that the preamble must be considered as prior art should form a part of the analysis. In re Ehrreich, 590 F.2d 902, 909-10, 200 USPQ 504, 510 (CCPA 1979); In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). Appellants' specification discloses (pages 5-8), "[v]arious processes for the manufacture of inulin from plant sources...." In addition, the preamble of appellants' independent claims addresses a process for the manufacture of chicory inulin through conventional manufacturing techniques. Accordingly, we find the preamble of appellants' claims to be an implied admission that conventional manufacturing techniques for chicory inulin is known in the prior art. Therefore, we limit our discussion to the improvement of this process as set forth in appellants' claimed invention.

### DISCUSSION

#### Claims 65-70, 72-78 and 89-97:

According to the examiner (Answer, page 4), Yamazaki "teach a method for processing of [sic] chicory inulin from chicory roots through conventional manufacturing techniques, wherein Yamazaki ... disclose that the source material for the process are tubers of Jerusalem artichoke (see column 11, lines

62-66)....” While the examiner appears to equate Jerusalem artichoke to chicory, appellants explain (Brief, bridging sentence, pages 9-10) that Yamazaki teach an “aqueous inulin solution is obtained from tubers of Jerusalem artichoke or from chicory roots by extraction with hot water according to a purely conventional process (... col. 10, line 57 to col. 11, line 4).” According to the examiner (Answer, page 4), Yamazaki disclose that the plants should be “harvested in late October and ideally should be processed within a few months....” However, as appellants explain (Brief, page 10), “the process for obtaining the aqueous solution of inulin, including the source chicory roots, disclosed in Yamazaki ... is completely conventional.” Consistent with appellants’ statement, the examiner finds (Answer, page 5), Yamazaki does not teach appellants’ claimed periods of seeding, growing and processing.

The examiner relies on Van Den Ende to make up for the deficiency in Yamazaki. Of the four points summarized by the examiner (Answer, page 5), we find two to have particular relevance to the merits of the examiner’s rejection. First, the examiner finds (id.), Van Den Ende teach “the source material for the process are roots of chicory grown in appropriate regions and processed under proper climatological temperature which has not triggered fructan exohydroxylase (FEH) in chicory roots (see page 44, column 1, paragraphs 1-4, page 47, column 1, paragraph 2)....” The examiner, however, fails to identify the evidence in Van Den Ende that fructan exohydroxylase has not been triggered. In this regard, we note that the passage cited by the examiner, paragraph 2 of the first column of page 47, refers to Van Den Ende’s figure 4. As discussed in



the last two lines of the bridging paragraph of columns 1 and 2 on page 47, the open ("□") symbols set forth in figure 4 illustrate the "real fructan exohydrolase activity," which became significant after October 15th<sup>4</sup>." Accordingly, figure 4 of Van Den Ende graphically illustrates the increase in fructan exohydrolase activity. See Figure 4, open ("□") symbols. See also, Van Den Ende, page 48, column 2, second full paragraph, "it is clear that the hydrolase activity in the roots increases after October 15th (Fig. 4). Thus, in our opinion, the evidence relied upon does not support the examiner's assertion. In addition, we note that the growing period from June 1, 1994 through October 15, 1994 is 136 days, which is less than the growing period "of at least 180 days" for plants seeded on June 1 as required by appellants' claimed invention.

Second, the examiner finds (Answer, page 5), Van Den Ende teach "chicory roots were grown for a period of at least 150 days[ ]- 180 days and the [growth] period [is] selected from periods ranging from June 1, July 26<sup>th</sup> to November 3<sup>rd</sup>, October 4<sup>th</sup> to October 25<sup>th</sup>, September 13<sup>th</sup> to December 6<sup>th</sup>] (see page 44, column 1, paragraph 4)...."<sup>5</sup> While the examiner asserts (Answer, page 10), "[t]he broad limitations recited in the instant claim 65 does not exclude any day in a year and overlaps with the periods taught by Van Den Ende et al.,"

---

<sup>4</sup> We understand this date to represent a growing period of June 1, 1994 through October 15, 1994. See Van Den Ende, page 44, column 1, last paragraph.

<sup>5</sup> According to Van Den Ende (page 44, column 1, last paragraph), plants were "sown in a local field ... on June 1, 1994. On a weekly basis, nine plants were uprooted to investigate fructan synthesizing (July 26th - November 3rd) and/or fructan degrading (September 13th - December 6th) activities. On two different dates (October 4th and October 25th) a number of plants were uprooted, the leaves were cut off ... and the roots were stored at +1°C for 3 weeks." We understand this to mean that the growth period would be from June 1, 1994 through the date the plants were uprooted for investigation, e.g., June 1, 1994 through July 26<sup>th</sup>, a growth period of 55 days; and June 1, 1994 through December 6<sup>th</sup>, a growth period of 188 days

according to the proviso set forth in appellants' claimed invention, "when said chicory has been seeded in the period[] ... from June 1 till June 14, the chicory roots have had a growing period of at least 180 days." As set forth in Van Den Ende, (page, 44, column 1, last paragraph), the plants were sown on June 1, 1994. According to the proviso language of the claimed invention, plants sown on June 1, 1994 must have a growing period of at least 180 days. Stated differently, the plants must be grown for the period covering at least June 1, 1994 through November 28, 1994. As we understand Van Den Ende, the growth period for the investigation of fructan degrading activity (June 1 through September 13th – December 6th) would overlap with the claimed range.

However, appellants' claimed invention also requires, inter alia, that

during a period of at least from the beginning of the third month of the growing period till the end of the processing of the chicory roots the fructan exohydrolase (FEH) gene in the chicory roots has not been triggered by the occurrence of low temperature conditions which are such that the temperature in a thermometer shelter shall not have dropped below minus 1°C.

As appellants explain (Brief, page 12),

The present inventors have surprisingly found that temperature conditions which trigger the FEH gene may even occur during a certain period of the growing phase, but that, in order to obtain inulin with a desired high ( $\overline{DP}$ ) ..., the FEH triggering temperature conditions may not occur during a specific period of the growing-harvesting-storage-processing period.

The examiner provides no evidence, and we find none, to suggest that Van Den Ende recognized that it is critical that the temperature not drop to the point where the temperature within a thermometer shelter drops below minus 1°C. Van Den Ende, however, does teach that fructan exohydrolase activity increases after

October 15<sup>th</sup>. The examiner provides no explanation as to why this express teaching of an increase in fructan exohydrolase activity (e.g., the triggering of the fructan exohydrolase gene) is not directly counter to appellants' claimed invention. At best, the examiner asserts (Answer, page 12), Van Den Ende "disclose that low temperature be avoided for the cultivation of chicory roots processing includes [sic] storage of roots, which was carried out at +1°C, suggesting no effect of low temperatures." According to the examiner (id.),

The effect of low temperatures on inulin degradation is a limiting parameter which is obvious and known from the prior art cited. Thus the limiting parameter (low or frost temperatures) is known at the filing [sic] of the instant patent application and it is prima facie [sic] obvious to avoid such conditions in the cultivation of chicory roots. Thus it is prima facie [sic] obvious to optimize the cultivating conditions not to fall in the low temperature conditions.

As set forth in In re Antonie, 559 F.2d 618, 619, 195 USPQ 6, 8 (CCPA 1977), "[j]ust as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention as a whole, and not some part of it, which must be obvious under 35 USC [§] 103. Cf. In re Papesch, 50 CCPA 1276, 315 F.2d 381, 137 USPQ 43 (1963)"; In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art."). While the examiner is correct in that "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art," In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980) (citations omitted), we caution the examiner against stretching this general principle to far. In this regard, we remind the examiner that every case, particularly those raising

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the issue of obviousness under section 103, must necessarily be decided upon its own facts. In re Jones, 958 F.2d 347, 350, 21 USPQ2d 1941, 1943 (Fed. Cir. 1992). In addition, as set forth in Antonie, F.2d at 621, 195 USPQ at 8:

obvious to try is not the standard of 35 USC 103. In re Tomlinson, 53 CCPA 1421, 363 F.2d 928, 150 USPQ 623 (1966). Disregard for the unobviousness of the results of "obvious to try" experiments disregards the "invention as a whole" concept of §103, In re Dien, 54 CCPA 1027, 371 F.2d 886, 152 USPQ 550 (1967) and In re Wiggins, 55 CCPA 1356, 397 F.2d 356, 158 USPQ 199 (1968), and overemphasis on the routine nature of the data gathering required to arrive at appellant's discovery, after its existence became expected, overlooks the last sentence of §103. In re Saether, 492 F.2d 849, 181 USPQ 36 (CCPA 1974).

On this record, the examiner appears to suggest that it would have been obvious to optimize the conventional manufacture of chicory inulin by avoiding low temperatures as taught by Van Den Ende. The examiner, however, provides no evidence, and we find none, to suggest that Van Den Ende recognized that it is critical that the temperature not drop to the point where the temperature within a thermometer shelter drops below minus 1°C. The examiner offers no evidence to support a conclusion that optimization of the conventional chicory inulin process through the use of the teachings of Van Den Ende would have lead a person of ordinary skill in the art to appellants' claimed invention when it is considered as a whole.

We also note the examiner's statement (Answer, page 10), "[t]he analysis of inulin in different growing and processing periods indicates the inulin synthesis and degradation, include the periods (July 26<sup>th</sup> to August 20<sup>th</sup>) (no frost season), where the higher DP inulin was produced." Other than emphasizing that the period of July 26<sup>th</sup> to August 20<sup>th</sup> is a "no frost season" (or a period wherein the

temperature in a thermometer shelter shall not have dropped below minus 1°C), we fail to understand how this statement applies to the claimed invention. The growing period of June 1<sup>st</sup> through July 26<sup>th</sup>; and June 1<sup>st</sup> through August 20<sup>th</sup> is 55 – 80 days, significantly less than the required growing period of at least 180 days, for plants seeded June 1<sup>st</sup>, as set forth in appellants' claimed invention.

We also recognize the examiner's reference to In re Cruciferous Sprout Litigation, 301 F.3d 1343, 64 USPQ2d 1202 (Fed. Cir. 2002), to support the proposition that the "growing conditions in Belgium for the time period reported in Van Den Ende et al. did not fall below 1°C." See Brief, page 15, citing the examiner's Advisory Action. The issue in Cruciferous Sprout Litigation was whether the claimed invention was anticipated under 35 U.S.C. §102(b). See Cruciferous Sprout Litigation, F.3d at 1349, 64 USPQ2d at 1206. In affirming the rejection in Cruciferous Sprout Litigation, the Court found the prior art of record inherently contains the limitations set forth in the claim. Contrary to the issue in Cruciferous Sprout Litigation, the issue before us on this appeal is whether the claimed invention is obvious under 35 U.S.C. §103. As set forth in In re Spormann, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966) "[t]hat which may be inherent is not necessarily known.... Obviousness cannot be predicated on what is unknown". Accordingly, we fail to see the nexus between Cruciferous Sprout Litigation and the issue before us on this record.

Further, we find no reference before us on this appeal that provides an evidentiary basis to support the examiner's assertion the temperature in Heverlee, Belgium did not fall below 1°C during the time period at which Van

Den Ende performed their study. As set forth in In re Lee, 277 F.3d 1338, 1345, 61 USPQ2d 1430, 1435 (Fed. Cir. 2002):

The determination of patentability on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

Furthermore, to the extent that the examiner would have relied on a "printout of weather conditions for Brussels, Belgium allegedly to show that growing conditions in Belgium for the time period reported in Van Den Ende et al. did not fall below 1°C," see Brief, page 15; as appellants point out (id.), "[t]he [e]xaminer has failed to establish prima facie that the temperature conditions in Heverlee [the locus of the Van Den Ende's study]... would be the same as the temperature conditions [in] Brussels." In this regard, we remind the examiner that conclusions of obviousness must be based upon facts, not generality. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968); In re Freed, 425 F.2d 785, 788, 165 USPQ 570, 571 (CCPA 1970).

On reflection, we note as set forth in In re Kotzab, 217 F.3d 1365, 1369-70, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000):

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. ... Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher."

Most if not all inventions arise from a combination of old elements. ... Thus, every element of a claimed invention may often be found in the prior art. ... However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. ... Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. [citations omitted]

In other words, "there still must be evidence that 'a skilled artisan ... with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.'" Ecolchem Inc. v. Southern California Edison, 227 F.3d 1361, 1375, 56 USPQ2d 1065, 1075-76 (Fed. Cir. 2000). For the foregoing reasons it is our opinion that the examiner failed to meet his burden of setting forth the evidence necessary to establish a prima facie case of obviousness. Accordingly, we reverse the rejection of claims 65-70, 72-78, and 89-97 under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende.



According to the examiner (Answer, page 8), "neither Yamazaki et al. nor Van Den Ende et al. teach the production of inulin free of monomeric saccharides, dimeric saccharides or oligofructose." Accordingly, the examiner relies on Van Loo to teach these limitations. Van Loo, however, fails to make up for the deficiency in the combination of Yamazaki and Van Den Ende as discussed above.

Therefore, we reverse the rejection of claims 79-88 under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende and Van Loo.

Having determined that the examiner has not established a prima facie case of obviousness, we find it unnecessary to discuss appellants' arguments (Brief, page 20) concerning unexpected results, relied on by appellants to rebut any such prima facie case.

Joe R. Scherer

*William E. Adams*

John M. Lee

Lora M. Green  
Administrative Patent Judge

## INTERFERENCES

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